SOUTHERN ENVIRONMENTAL LAW CENTER

Telephone 919-967-1450 | 601 WEST ROSEMARY STREET, SUITE 220 CHAPEL HILL, NC 27516-2356 | Facsimile 919-929-9421

December 9, 2019

Via E-mail and U.S.P.S.

Erik Spalvins, Remedial Project Manager
Latonya Spencer, Community Involvement Coordinator
U.S. EPA
Atlanta Federal Center
Superfund Remedial Branch
61 Forsyth Street, S.W.
Atlanta, Georgia 30303
Spalvins.Erik@epa.gov
Spencer.LaTonya@epa.gov

Re: Request for Reversal of No Action Decision in Proposed Plan for Kerr-McGee Superfund site in Navassa, North Carolina

Dear Mr. Spalvins and Ms. Spencer,

On behalf of the Navassa Community Economic and Environmental-Redevelopment Corporation ("NCEERC"), the Southern Environmental Law Center ("SELC") submits these comments on the Environmental Protection Agency's ("EPA") Proposed Plan for the Kerr-McGee Superfund site in Navassa, North Carolina.

NCEERC is a group of concerned citizens and neighbors working to regain and redevelop property and increase community economic prosperity. NCEERC provides an opportunity for people to share suggestions, comments, and concerns for the clean-up of the contaminated Kerr-McGee Site.

SELC is a non-profit legal advocacy organization dedicated to protecting the environment of the South. SELC believes that everyone deserves to breathe clean air, drink clean water, and live in a healthy environment. To that end, SELC partners with hundreds of nonprofit partner organizations to protect our region through public education, policy advocacy,

and legal action, including a wide variety of efforts to protect and improve water quality throughout the state. SELC strives to incorporate principles of environmental justice in its program work.

We strongly urge the EPA to abandon their proposed No Action remedy, and to require a comprehensive clean-up of the site, including the portion addressed in the Proposed Plan, Operable Unit 1 ("OU1").

I. BACKGROUND.

A. Industrial History of the Kerr-McGee Site.

The Kerr-McGee Chemical Corporation operated a wood-treating plant in Navassa from 1936 until 1974. There, Kerr-McGee workers applied creosote preservatives to various products, from railroad ties to telephone poles.[1] When Kerr-McGee dismantled the site in 1980 and its wastewater ponds were emptied, creosote-containing sludge from the wastewater ponds mixed with clean soil.[2] Creosote remains in the soil and sediment of the site, and the contaminated soils and sediments are leaching creosote-related contaminants to groundwater, which flows to the tidal marshes, Sturgeon Creek, and the Brunswick River.[3]

Creosote, a likely human carcinogen, can enter the human body through the lungs, stomach, intestines, and skin.[4] Exposure to creosote can irritate the respiratory tract; long-term direct skin exposure to even small amounts of creosote over time may lead to blistered or peeled

---

[1] *See* Martha Waggoner, *Residents of tainted town wary of government aid: Navassa, N.C., cleanup exacts high cost*, THE CHARLOTTE POST (Oct. 14, 2015 9:30 AM), http://www.thecharlottepost.com/news/2015/10/14/local/residents-of-tainted-town-wary-of-government-aid/.

[2] *See id.*

[3] *See, e.g.*, ENSR CORP., REVISED SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT KERR-MCGEE CHEM CORP SITE NAVASSA, NORTH CAROLINA 2-7 to 2-8 (2008), https://semspub.epa.gov/src/document/04/11134931.

[4] *See* AGENCY FOR TOXIC SUBSTANCES & DISEASE REGISTRY, PUBLIC HEALTH STATEMENT FOR CREOSOTE (2002), https://www.atsdr.cdc.gov/ToxProfiles/tp85-c1-b.pdf (hereinafter "ATSDR ON CREOSOTE").

skin and damage to the eyes.[5] Creosote is also absorbed by plants and animals, negatively impacting the natural environment.[6]

In 2005, Kerr-McGee created a spin-off corporation, Tronox, in an attempt to avoid environmental liabilities at multiple contaminated sites, including the Navassa location. Tronox lacked the capital to handle the environmental liabilities, and filed for Chapter 11 bankruptcy in 2009.[7] As a result of a fraudulent conveyance lawsuit, Tronox was found liable for damages of $5.15 billion. It was the largest governmental recovery for environmental cleanup in history.[8] The bankruptcy settlement ("Tronox settlement") allocated funds for cleanup costs at contaminated Kerr-McGee sites across the country.[9]

B. The Superfund Process and creation of the Multistate Environmental Response Trust.

The Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), commonly known as "Superfund," provides broad federal authority to respond directly to releases of hazardous substances that may endanger public health or the environment.[10] The statute's National Priorities List ("NPL") identifies the most hazardous sites for the purposes of prioritizing cleanup actions.[11] Sites are listed on the NPL after they have been scored using the Hazard Ranking System ("HRS"), and have been subject to public comment. The NPL thus contains the most contaminated properties that pose the most risk to

---

[5] *See* Waggoner, *supra* note 1; *Creosote*, U.S. ENVT'L PROT. AGENCY, https://www.epa.gov/ingredients-used-pesticide-products/creosote (last visited Dec. 6, 2019).
[6] *See* ATSDR ON CREOSOTE, *supra* note 4.
[7] *See* CONSENT DECREE AND ENVIRONMENTAL SETTLEMENT AGREEMENT 1, *In re: Tronox, Inc., et al.*, No. 09-10156 (ALG) (Bankr. S.D.N.Y. Jan. 20, 2011), https://semspub.epa.gov/src/document/04/11134940 (recognizing bankruptcy) (hereinafter "TRONOX CONSENT DECREE").
[8] *Case Summary: Tronox Incorporated Bankruptcy Settlement*, U.S. ENVT'L PROT. AGENCY, https://www.epa.gov/enforcement/case-summary-tronox-incorporated-bankruptcy-settlement (last visited Dec. 6, 2019).
[9] *See* TRONOX CONSENT DECREE, *supra* note 7.
[10] *See Superfund: CERCLA Overview*, U.S. ENVT'L PROT. AGENCY, https://www.epa.gov/superfund/superfund-cercla-overview (last visited Dec. 6, 2019).
[11] *See Superfund: National Priorities List (NPL)*, U.S. ENVT'L PROT. AGENCY, https://www.epa.gov/superfund/superfund-national-priorities-list-npl (last visited Dec. 6, 2019).

human health and the environment. The Kerr-McGee Superfund Site was added to the NPL in 2010 because of contaminated groundwater, soil, and sediment caused by facility operations.[12]

The Tronox settlement also created the Multistate Environmental Response Trust ("Multistate Trust"). The Multistate Trust owns and manages dozens of Kerr-McGee contaminated sites.[13] In 2011, the Multistate Trust assumed responsibility for the cleanup of the Kerr-McGee Superfund site in Navassa. The EPA is the lead agency on the investigation and cleanup, with the North Carolina Department of Environmental Quality ("DEQ") serving as the supporting agency. The cleanup and management of the property is conducted by the Multistate Trust. Under the terms of the Trust, any cleanup of the Kerr-McGee site should encompass those actions "authorized or required" under "all federal, tribal, state and local statutes, regulations, ordinances and similar provisions . . . including . . . CERCLA."[14]

C. Town of Navassa Demographics.

The Kerr-McGee Superfund Site is located in Navassa, North Carolina. The town of Navassa has a history of injustice that predates its 1977 incorporation.[15] Prior to the Civil War, enslaved people worked on the area's several rice plantations.[16] Post-Civil War, many descendants of enslaved people were employed by the Kerr-McGee Creosote Plant. Former Navassa Mayor Louis "Bobby" Brown recalls being paid less than $1 per hour in the 1950s to work at the operation, and that African-American workers like him were, generally, paid less than their white counterparts.[17] Several of the town's residents were employed by the fertilizer industry as well.[18] While many of the fertilizer enterprises have long since ceased their operations, the community remains affected by negative environmental impacts of both the

---

[12] *National Priorities List (NPL) Sites - by State*, U.S. ENVT'L PROT. AGENCY, https://www.epa.gov/superfund/national-priorities-list-npl-sites-state#NC (last visited Dec. 6, 2019).
[13] *Owned, Funded Sites*, GREENFIELD ENVIRONMENTAL MULTISTATE TRUST LLC, https://multi-trust.org/owned-fundedsites (last visited Dec. 6, 2019).
[14] TRONOX CONSENT DECREE, *supra* note 7 at 12, 25-26; *see also* ENVIRONMENTAL RESPONSE TRUST AGREEMENT 4 (2011), https://semspub.epa.gov/src/document/04/11134937.
[15] *History & Culture*, TOWN OF NAVASSA, http://townofnavassa.org/history-culture.html (last visited Dec. 6, 2019).
[16] *See* Waggoner, *supra* note 1; Mark Hibbs, *Navassa: A Century of Contamination*, COASTAL REVIEW ONLINE (July 12, 2016), http://www.coastalreview.org/2016/07/15389/ (explaining that the Kerr-McGee site is a former rice plantation).
[17] *See id*.
[18] *See* Waggoner, *supra* note 1.

fertilizer and creosote industries. Navassa covers only 14 square miles and has a population of fewer than 2,000 people, yet it currently has at least three heavily polluted sites[19]—the former Estech General Chemical Company site, the former Kerr-McGee Creosote Plant, and the former Cape Fear Meat Packing Plant.[20]

Given Navassa's demographics, minority and modest wealth populations bear the brunt of the contamination's detrimental impacts. The African-American population in North Carolina as a whole is 22.2%, with 14% of the state's population living below the poverty line.[21] Navassa's African-American population, however, is 70.6%, with 22.1% of the town's population living below the poverty line.[22] Brunswick County has a total of 30 golf courses and numerous large, waterfront properties, but Navassa has not experienced development at the same rate as the rest of the county.[23] Further, Navassa, and particularly the former Kerr-McGee Creosote Plant, remain largely undeveloped, while the rest of the county has seen rapid growth.[24] Had the Superfund site not been contaminated, it would likely be prime real estate due to its scenic river views.[25]

D. The EPA's Failure to Protect the Navassa Community from the Threat of Creosote Contamination.

Earlier this year, the Navassa site entered the remedial investigation and feasibility study phase of the cleanup process for a small portion of the Navassa contaminated site, labelling it as Operable Unit 1 ("OU1"). At that time, OU1 was designated as the 32-acres where the Treated and Untreated Wood Storage Areas were located. Creosote has been found in soils throughout this 32-acre tract. The size of OU1 was reduced to just over 21 acres by the time the Proposed Plan was released in October 2019.

---

[19] *See Navassa's Current Brownfield Remediation Efforts*, TOWN OF NAVASSA, http://townofnavassa.org/brown-field.html (last visited Dec. 6, 2019).
[20] *See id.*; *see also* Waggoner, *supra* note 1.
[21] *See QuickFacts North Carolina*, U.S. CENSUS BUREAU, http://www.census.gov/quickfacts/table/PST045216/37 (last visited Dec. 3, 2019).
[22] *See Navassa, NC*, DATAUSA, https://datausa.io/profile/geo/navassa-nc (last visited Dec. 6, 2019).
[23] Mark Hibbs, *Navassa: From Guano to Creosote*, COASTAL REV. ONLINE, https://www.coastalreview.org/2016/07/15413/ (last visited Dec. 6, 2019).
[24] *Id.*
[25] *Id.*

On Monday, October 7, 2019, the EPA released its shocking decision: despite a clean-up budget of $93 million dollars, documented contamination at OU1, and an anticipated clean-up cost at OU1 of only $3 million, the agency recommended a decision to do absolutely nothing to remediate the documented contamination in OU1. The law, policy, and clean-up precedent associated with these types of wood treatment sites require the EPA to reverse its decision and to require a comprehensive cleanup of the Kerr-McGee Superfund site to protect the Navassa community and the surrounding environment.

II. THE PROPOSED PLAN VIOLATES CERCLA'S OVERARCHING MANDATE.

The "overarching mandate" of CERCLA is "to protect human health and the environment from the current and potential threats" posed by releases of hazardous substances.[26] To ensure that CERCLA cleanups meet this standard, Congress simply made it a legal requirement: remedial actions must attain a degree of cleanup "at a minimum which assures protection of human health and the environment."[27] Anything less violates CERCLA.

Congress further structured the process for selecting a remedial action alternative to ensure that cleanups are protective.[28] CERCLA cleanups are conducted pursuant to provisions of the NCP.[29] Overall, the "purpose of the remedy selection process is to implement remedies that eliminate, reduce, or control risks to human health and the environment"[30] and the goal of the process is to "select remedies that are protective of human health and the environment, that

---

[26] National Oil and Hazardous Substances Pollution Contingency Plan, 55 Fed. Reg. 8666-01, 8703 (March 8, 1990); *see also Westfarm Assocs. Ltd. P'ship v. Washington Suburban Sanitary Comm'n*, 66 F.3d 669, 677 (4th Cir. 1995); *Pub. Serv. Co. of Colo. v. Gates Rubber Co.*, 175 F.3d 1177, 1181 (10th Cir. 1999).

[27] 42 U.S.C. § 9621(d)(1); *see also* 42 U.S.C. §§ 9604(c)(4), 9621(a), (d)(1); 40 C.F.R. § 300.430(e)(9)(iii)(B), 300.430(f)(5)(ii)(B).

[28] *See* 40 C.F.R. § 300.430(f)(1)(i)(A) (threshold criteria), 300.430(e)(7)(i) (explaining that in feasibility study, "Alternatives that do not provide adequate protection of human health and the environment shall be eliminated from further consideration."); 300.430(f)(1)(ii)(A) ("Each remedial action selected shall be protective of human health and the environment."); 300.430(f)(1)(ii)(D) (providing that a remedial action must be cost-effective "provided that it first satisfies the threshold criteria").

[29] *See* 42 U.S.C. § 9604(a)(1) (requiring the EPA to act "consistent with the national contingency plan"); 40 C.F.R. §§ 300.2 ("The NCP is applicable to response actions taken pursuant to the authorities under CERCLA . . . ."), 300.3(b)(4) (stating that the NCP provides "Procedures for undertaking response actions pursuant to CERCLA."); *see Pub. Serv. Co. of Colo.*, 175 F.3d at 1181 ("The NCP is EPA's regulatory template for a 'CERCLA quality cleanup.'").

[30] 40 C.F.R. § 300.430(a)(1).

maintain protection over time, and that minimize untreated waste."[31] Accordingly, the EPA "expects to use treatment to address the principal threats posed by a site, wherever practicable."[32]

The EPA's decision to take "no further action" on OU1 violates CERCLA, the NCP, and EPA guidance. Specific flaws are outlined in the sections that follow. As a result, the Proposed Plan for OU1 does not satisfy CERCLA's mandate to protect human health and the environment. The EPA must reverse its decision and require a CERCLA-quality cleanup of OU1.

A. The baseline risk assessment in the remedial investigation, which forms the basis of remedy selection, is deeply flawed.

The NCP prescribes a mandatory process for selecting a remedy. At the heart of this process are the remedial investigation ("RI") and feasibility study ("FS"). The purpose of the RI/FS process is "to assess site conditions and evaluate alternatives to the extent necessary to select a remedy."[33] In this first step, the RI must adequately characterize the site for the purpose of selecting remedial alternatives.[34] At a minimum, the EPA must conduct a field investigation, including treatability studies, and create a baseline risk assessment.[35] The data collected during the field investigation include the physical characteristics of the site and the hazardous material present as well as the exposure pathways through which the hazardous material may affect human health and the environment.[36] Part of this mandatory process involves estimating the reasonable maximum exposure that is likely to occur for both current and potential future land use at the site.[37] The EPA then must identify the applicable cleanup standards for the site, known as "ARARs."[38]

---

[31] *Id.* § 300.430(a)(1)(i).
[32] *Id.* § 300.430(a)(1)(iii)(A).
[33] *Id.* § 300.430(a)(2).
[34] *See id.* § 300.430(b), (c), (d).
[35] *See id.* § 300.430(d)(1).
[36] *See id.* § 300.430(d)(2)(i)-(vii).
[37] *See* EPA, RISK ASSESSMENT GUIDANCE FOR SUPERFUND, VOLUME 1: HUMAN HEALTH EVALUATION MANUAL (PART A) (Dec. 1989), https://www.epa.gov/sites/production/files/2015-09/documents/rags_a.pdf (hereinafter "RAGS Part A").
[38] 40 C.F.R. § 300.430(d)(3). "ARARs" are Applicable or Relevant and Appropriate Requirements—essentially, the applicable cleanup standards required by state or federal law, or any more stringent standards that are not applicable but are relevant to cleanup at the site. *See id.* §§ 300.4 (defining "ARARs"), 300.5 (defining "Applicable requirements" and "Relevant and appropriate requirements"); *see*

Using the information gathered, the EPA must conduct a "site-specific baseline risk assessment to characterize the current and potential threats to human health and the environment that may be posed by contaminants migrating to ground water or surface water, releasing to air, leaching through soil, remaining in the soil, and bioaccumulating in the food chain."[39] The baseline risk assessment helps to establish "acceptable exposure levels for use in developing remedial alternatives in the FS."[40] The baseline risk assessment is divided into a human health risk assessment ("HHRA") and an ecological risk assessment.[41]

The baseline risk assessment drives the ultimate selection of a remedy, even allowing no action:

> *[i]f* the baseline risk assessment and the comparison of exposure concentrations to chemical-specific standards indicates that there is no unacceptable risk to human health or the environment and that no remedial action is warranted, then the CERCLA Section 121 cleanup standards for selection of a Superfund remedy, including the requirement to meet applicable or relevant and appropriate requirements (ARARs), are not triggered.[42]

The requirements for no action are not satisfied here. First, the HHRA improperly excludes residential use. Second, the HHRA improperly assesses the risks associated with recreational use. Third, the HHRA disregards substantial exceedances of cumulative cancer risk and chemical-specific standards. Finally, there are serious flaws in the sampling underlying the HHRA.

---

also U.S. ENVT'L PROT. AGENCY, BEST PRACTICES FOR IDENTIFYING AND DETERMINING STATE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS STATUS PILOT 1 (Oct. 20, 2017), https://semspub.epa.gov/src/document/HQ/197017 (stating that "identification and determination of state and federal ARARs is a fundamental component of remedy selection").

[39] 40 C.F.R. §§ 300.430(d)(4).

[40] *Id.*

[41] *See* U.S. ENVT'L PROT. AGENCY, ROLE OF THE BASELINE RISK ASSESSMENT IN SUPERFUND REMEDY SELECTION DECISIONS, OSWER Directive 9355.0-30 at 2 (1991), https://www.epa.gov/sites/production/files/2015-11/documents/baseline.pdf (hereinafter "1991 EPA Directive").

[42] *Id.*at 6.

1. Once cleaned up, OU1 may be used for residential development.

CERCLA cleanup decisions are based in part on reasonably anticipated future land use.[43] To develop assumptions about reasonably anticipated future uses, the EPA should consult "local land use planning authorities, local officials, and the public."[44] EPA guidance explains that "[t]he potential land use associated with the highest level of exposure and risk that can reasonably be expected to occur should be addressed in the baseline risk assessment."[45] The HHRA properly considers residential exposure,[46] but then summarily excludes residential use without explanation.[47]

The decision to exclude residential use is explained post-hoc in the Proposed Plan. In the Proposed Plan, the EPA cites four bases for the determination that the "Reasonably Anticipated Future Land Use" for the site is "commercial, industrial or recreational":

> The future land use is based on [1] community input through the Redevelopment Planning Initiative, [2] the local zoning designation, [3] discussion with local government, and [4] the State's statutory requirement for a restrictive covenant to prevent residential use or specific commercial uses such as daycares and schools.[48]

---

[43] U.S. ENVT'L PROT. AGENCY, LAND USE IN THE CERCLA REMEDY SELECTION PROCESS, OSWER Directive No. 9355.7-04 (May 25, 1995), *available at* https://www.epa.gov/sites/production/files/documents/landuse.pdf (hereinafter "1995 EPA Directive").
[44] *Id.* at 4.
[45] *See* 1991 EPA Directive, *supra* note 41 at 5 (explaining that "An adequate consideration of future risk may necessitate the assessment of risks assuming a land use different from that which currently exists at the site. The potential land use associated with the highest level of exposure and risk that can reasonably be expected to occur should be addressed in the baseline risk assessment.").
[46] *See* EARTHCON, HUMAN HEALTH RISK ASSESSMENT: KERR-MCGEE CHEMICAL CORP - NAVASSA SUPERFUND SITE, NAVASSA, NORTH CAROLINA, VOL. 1, 4, 37 (2019), https://semspub.epa.gov/src/document/04/11134926 (hereinafter "HHRA"); *see also* 1991 EPA Directive, supra note 41 at 5.
[47] *See* HHRA, *supra* note 46 at 81.
[48] U.S. ENVT'L PROT. AGENCY, PROPOSED PLAN: KERR-MCGEE CHEMICAL CORP-NAVASSA SUPERFUND SITE OPERABLE UNIT 1 at 18 (Oct. 2019), https://semspub.epa.gov/work/04/11134934.pdf (hereinafter "PROPOSED PLAN FOR OU1"). The site "is zoned industrial at present." *Id*. The Proposed Plan for OU1 also states:

> Based on the local zoning designation and on the redevelopment discussions with the local government and the community, the reasonably anticipated future land uses are commercial, industrial or recreational development. In addition, on September 3, 2019, the State informed the Multistate Trust of the requirement to implement institutional controls under North Carolina

Concerning the fourth basis, the Proposed Plan simply states:

> On September 3, 2019, NC DEQ formally notified the Multistate Trust of the requirement under North Carolina General Statutes § 143B-279.9 and § 130A-310.3(f) to implement institutional controls, including permanent institutional controls to prevent residential land use on the property in the form of a restrictive covenant or covenants that meet all of the requirements of the North Carolina General Statutes, including North Carolina General Statutes § 143B-279.9 and § 130A-310.3(f). On September 11, 2019, the Multistate Trust documented its commitment to establishing permanent institutional controls.[49]

These bases do not support a determination that the reasonably anticipated future uses of OU1 do not include residential development. The first basis—community input—is contrary to the evidence: the Navassa community has not ruled out residential development. To survey the community regarding its future development preferences, in February 2018 the EPA and the Multistate Trust convened "visioning" workshops.[50] In the workshops, community members and other members of the public created different development scenarios for the site. Two of the ten scenarios envisioned residential use on OU1,[51] and another four envisioned it very nearby.[52] With more than half of the visioning scenarios placing residential development on or near OU1, it is unreasonable to conclude that the community would not develop the site for that use.

There are already two mixed use developments underway in Navassa—River Bend at Cedar Hill and Indian Creek, both of which were permitted as "Planned Unit Developments," and both of which have residential and commercial elements. Mixed use development would certainly fall into the EPA's definition of "residential," which is simply defined as "Those areas

---

General Statutes 143B-279.9(b)(1) because soil exceeds 'unrestricted use standards.' On September 11, 2019, the Multistate Trust documented its commitment to establishing permanent institutional controls. *Id.* at 11.

[49] *Id.* at 17.

[50] *See* Greenfield Environmental Multistate Trust LLC, Kerr-McGee Chemical Corp. Superfund Site, Navassa, North Carolina, Visioning Workshop Meeting Presentation (Feb. 24, 2018), https://multi-trust.org/wp-content/uploads/2018/03/Navassa-Visioning-Workshop-PPT-Saturday-2018-2-24-small.pdf (hereinafter "MST Presentation").

[51] *Id.* at 33-34.

[52] *Id.* at 30-32, 35.

where people live or reside, or where people work in other than manufacturing or farming industries. Residential areas include housing and the property on which housing is located, as well as playgrounds, roadways, sidewalks, parks, and other similar areas within a residential community."[53] As such, this option, which Navassa is increasingly embracing, would be foreclosed if the EPA opts not to remediate the contamination.

The EPA's reliance on the current local zoning designation as a second basis is equally unreasonable. The site is currently zoned industrial precisely *because* it used to be an active industrial site—the zoning is simply a historical artifact. Once Kerr-McGee/Tronox ceased operations, the site remained highly contaminated and there was no reason for the town to re-zone it. Furthermore, the town has designated the site to be zoned "general commercial," in its "Future Land Use Map 2009 to 2030."[54] Notably, this decision was made before the site entered the Superfund program in 2010 and therefore was likely based on the assumption that it would not be cleaned up to residential standards.

The third basis—discussion with local government—is difficult to assess without additional information about the conversations that the EPA and Multistate Trust staff had with local government officials. However, statements made in a discussion are not necessarily accurate gauges of policy plans, as described above.

The final, fourth, basis is arbitrary because it relies on circular reasoning. It is founded on a September 3, 2019 letter from Jim Bateson, the chief of DWM's Superfund Section, to Richard Elliott at the Multistate Trust.[55] The letter states that the EPA "has proposed a No Action Remedy for 21.6 acres" of the site, OU1. It then states that soil sampling results presented in the final remedial investigation report and a technical memorandum

---

[53] 40 C.F.R. § 761.123 (defining "residential areas" under the Toxic Substances Control Act).
[54] TOWN OF NAVASSA, FUTURE LAND USE MAP 2009 TO 2030 (revised April 21, 2009), http://users.neo.registeredsite.com/9/7/3/12477379/assets/Official_Navassa_FLU_11_X_17.pdf (showing the Kerr-McGee site as a long red block on the far right); *see* 1995 EPA Directive, *supra* note 43, at 6 (directing the EPA to reference comprehensive plan to predict future use).
[55] *See* Letter from Jim Bateson, Chief of Superfund Section, N.C. DEQ Division of Waste Management, to Richard Elliot, Director of Construction Services and Senior Project Manager, Greenfield Environmental Multistate Trust, at 1 (Sept. 3, 2019), https://semspub.epa.gov/src/document/04/11134983.

> indicate that under the *Proposed Plan*, soil will remain in OU1 that exceeds 'unrestricted use standards' under North Carolina General Statutes 143B-279.9(b)(1). **As a result**, the North Carolina Department of Environmental Quality (NC DEQ) has determined that institutional controls are required by North Carolina General Statutes § 143B-279.9 and § 130A-310.3(f). . . . "the NC DEQ understands that the Multistate Trust will establish permanent Institutional Controls, subject to NC DEQ approval and concurrence, to prevent residential land use on the property in the form of a restrictive covenant or covenants that meet all of the requirements of [those statutes].[56]

In response on September 11, Mr. Elliott states that the trust understands the requirement for institutional controls given the contaminated soils and it will establish them.

In other words, the state sent the Multistate Trust a letter saying that, because the EPA plans not to clean up OU1 and OU1 contains contaminated soil, under North Carolina law the Multistate Trust must establish a restrictive covenant prohibiting residential use. Now in its Proposed Plan for OU1, the EPA is saying that it does not need to clean up OU1 because the Multistate Trust must put OU1 under a restrictive covenant forbidding residential use. This is circular: the EPA is not going to clean it up, so it cannot be used for residential development, and because it cannot be used for residential development the EPA is not going to clean it up.

Finally, other information that the EPA should consider in determining reasonably anticipated future land use also indicates that residential use is likely.[57] As noted, had the site not been contaminated, it would likely be prime real estate due to its scenic river views.[58] Moreover, as we detail in later sections of this letter, Brunswick County and the Wilmington area

---

[56] *Id.* (bold emphasis added).
[57] *See* 1995 EPA Directive, *supra* note 43 at 5.
[58] *Id*.

are growing rapidly; [59] the site lies across the road from existing residential development, near the center of Navassa;[60] and there are environmental justice issues associated with the site.

2. The No Action alternative is inappropriate even if the reasonably anticipated future uses for the site are limited to commercial, industrial, and recreational.

Taking no action will not make the site safe for recreational use. In the Proposed Plan, the EPA acknowledges the potential future recreational use,[61] apparently based on the visioning scenarios developed in February 2018, many of which envisioned parks and other recreational facilities such as walking trails, golf courses, and marinas on OU1 and other parts of the site.[62] But rather than taking into account these likely recreational uses, the EPA unreasonably bases its No Action decision on the faulty assumption that recreational users will be adequately protected by the combined "use scenario," "Teenage trespasser/walking recreator."[63]

The assumption that a teenage trespasser is equivalent to a "recreator" derives from errors made in the HHRA.[64] The HHRA asserts, without support, that the exposure risk to a "teenage trespasser" is equivalent to the exposure risk to a "recreator":

> A teenage trespasser scenario was also evaluated based on the close proximity of the Site to residential areas and the attractiveness (marsh areas) of the Site to a trespasser (USEPA, 2018a). The exposure assumptions used to evaluate the trespasser are

---

[59] *See Quickfacts Brunswick County North Carolina, Wilmington city, North Carolina,* U.S. CENSUS BUREAU, https://www.census.gov/quickfacts/fact/table/brunswickcountynorthcarolina,wilmingtoncitynorthcarolina/PST045218 (last visited Dec. 6, 2019); *see also* HHRA, *supra* note 46 at 11.
[60] *Superfund Site: Kerr-McGee Chemical Corporation,* U.S. ENVT'L PROT. AGENCY, https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.cleanup&id=0403028(last visited Dec. 5, 2019).
[61] PROPOSED PLAN FOR OU1, *supra* note 48 at 11.
[62] MST Presentation, *supra* note 50.
[63] PROPOSED PLAN FOR OU1, *supra* note 48 at 17.
[64] HHRA, *supra* note 46; EARTHCON, HUMAN HEALTH RISK ASSESSMENT: KERR-MCGEE CHEMICAL CORP - NAVASSA SUPERFUND SITE, NAVASSA, NORTH CAROLINA, VOLUME 2: APPENDICES (2019), https://semspub.epa.gov/src/document/04/11134927; *see also* EARTHCON, HUMAN HEALTH RISK ASSESSMENT ADDENDUM: KERR-MCGEE CHEMICAL CORP - NAVASSA SUPERFUND SITE, NAVASSA, NORTH CAROLINA (2019), https://semspub.epa.gov/src/document/04/11134928.

protective of a recreator; therefore, risk and hazard to a recreator were not quantified separately in this HHRA.[65]

From there and throughout the HHRA and Proposed Plan, the EPA improperly equates recreators with trespassers, excluding from its consideration true recreational uses of the site.

Equating these two use scenarios is contrary to federal and state guidance, and contrary to common sense. The EPA's Risk Assessment Guidance for Superfund ("RAGS") Part A, the Human Health Evaluation Manual, identifies three primary types of land use to consider: residential, commercial/industrial, and recreational[66] and explains that risk evaluators should characterize activity patterns according to the percent of time that the potentially exposed populations would spend on the site, whether activities occur indoors or outdoors, seasonal changes, whether the site would be used by local populations, and any site-specific population characteristics that might influence exposure.[67] In other words, the risk assessment should be based on what people will do at the site. If parts of OU1 are developed for recreational use, they will likely be parks and nature trails.

The various risk parameters will have different values for recreational users and for trespassers because they are different populations engaged in different activities. The populations are different: recreational users may include people of all ages and types, whereas trespassers likely will be teenagers (and often are defined as such). Recreational users will likely spend more time at the site. For one thing, their presence at recreational facilities such as parks is lawful—and even encouraged—whereas trespassers' presence is unlawful by definition.[68] The two groups will engage in different activities during their time on-site. Whereas recreational users easily could spend an entire day picnicking, barbecuing, or playing sports, trespassers can be expected to attempt to engage in activities that are less obvious to an observer. And these

---

[65] HHRA, *supra* note 46 at 35.
[66] RAGS Part A, *supra* note 37 at 6-6.
[67] *Id. at* 6-6 to 6-7.
[68] *See* N.C. DEP'T OF ENVT'L QUALITY, RISK EVALUATION EQUATIONS AND CALCULATIONS 22 (2017), https://files.nc.gov/ncdeq/Waste%20Management/DWM/SF/RiskBasedRemediation/20171024_RiskEvalEqnsandCalcs.pdf (hereinafter "NC RISK GUIDANCE") (discussing standard equations for assessing carcinogenic risk from dermal contact with soil, citing default exposure frequencies of 195 days per year for recreators and 90 days per year for trespassers).

different activities will result in different exposures. For example, the amount of "soil loading" on individuals' skin varies depending on the activity the person was engaged in,[69] affecting the "contact rate" or the amount of the contaminated medium that a person would contact in a given amount of time, which is a key variable in determining the reasonable maximum exposure.[70] Contaminants in soil may present an unacceptable cancer risk to those who use a recreational field to engage in a contact sport, or to the small child who puts soil or soiled fingers into her mouth. In contrast, a smaller cancer risk would assumed by the teenage trespasser simply walking on the contaminated soil.[71]

The common-sense observation that these two use scenarios will entail different risk explains why equating those conflicts with federal and state guidance. EPA Region 4's draft supplemental guidance for human health risk assessments explains that

> Region 4 considers the typical trespasser to be an adolescent aged 7-16 (10 year exposure duration) with a body weight of 45 kilograms (kg) as representative of this age range. Trespasser exposure frequency should consider site-specific factors such as distance from the site to residences and the attractiveness of the site to the trespasser.[72]

These traits plainly do not correspond to all recreational users, who may range across all ages and body types. Similarly, in its guidance document for human health risk assessments, DEQ combines recreational users and trespassers for discussion, but explicitly identifies separate equations for the two,[73] as well as different default exposure assumptions.[74] Consistent with this

---

[69] U.S. ENVT'L PROT. AGENCY, EXPOSURE FACTORS HANDBOOK 7-17 to 7-18 (2011), http://ofmpub.epa.gov/eims/eimscomm.getfile?p_download_id=522996.
[70] RAGS Part A, *supra* note 37 at 6-19 to 6-22.
[71] *See Chart v. Town of Parma*, No. 10-CV-6179P, 2014 WL 4923166 at *18 (W.D.N.Y. Sept. 30, 2014).
[72] U.S. ENVT'L PROT. AGENCY, JANUARY 2014 DRAFT FINAL: REGION 4 HUMAN HEALTH RISK ASSESSMENT SUPPLEMENTAL GUIDANCE 4-2, https://www.epa.gov/sites/production/files/2015-09/documents/region_4_hhraguidedoc011014.pdf.
[73] *See, e.g.*, NC RISK GUIDANCE, *supra* note 68 at 20-22 (showing standard equations for dermal contact with soil). RAGS Part F, the EPA's Supplemental Guidance for Inhalation Risk Assessment, also discusses the recreational user and trespasser exposure scenarios together. U.S. ENVT'L PROT. AGENCY, RISK ASSESSMENT GUIDANCE FOR SUPERFUND VOL. 1: HUMAN HEALTH EVALUATION MANUAL (Part F, Supplemental Guidance for Inhalation Risk Assessment) 25-26 (2009), https://www.epa.gov/sites/production/files/2015-09/documents/partf_200901_final.pdf. However, the combined *discussion* does not indicate that the two scenarios are *equivalent*.

guidance, recreational and trespasser use scenarios have been analyzed separately in prior Superfund human health risk assessments.[75]

Accordingly, the EPA's assumption that the exposure risk faced by a teenage trespasser equates to the exposure risk to a person participating in recreation at the site is incorrect and renders the HHRA insufficient to show that a No-Action alternative will adequately protect human health and the environment.

3. The EPA's No Action decision disregards substantial exceedances of cumulative cancer risk and chemical-specific standards, leaving exposed populations facing unacceptable risk.

The HHRA should "characterize the current and potential threats to human health and the environment that may be posed by contaminants migrating to ground water or surface water, releasing to air, leaching through soil, remaining in the soil, and bioaccumulating in the food chain."[76] The HHRA should review at least two types of risk: cumulative lifetime excess cancer risk and chemical-specific standards for acceptable risk levels.[77] A decision to take no action in a CERCLA cleanup is allowed *only if* "the baseline risk assessment and the comparison of exposure concentrations to chemical-specific standards indicates [sic] that there is no unacceptable risk to human health or the environment."[78]

---

[74] NC RISK GUIDANCE, *supra* note 68 at 22 (discussing standard equations for assessing carcinogenic risk from dermal contact with soil, citing default exposure frequencies of 195 days per year for recreators and 90 days per year for trespassers).

[75] *See, e.g.*, EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., FINAL ADDENDUM HUMAN HEALTH RISK ASSESSMENT FOR MARSH RUN PARK NEW CUMBERLAND, FAIRVIEW TOWNSHIP, YORK COUNTY, PENNSYLVANIA FUDS No. C03PA040301 at 3-1 to 3-2 (2012), https://www.twp.fairview.pa.us/Portals/0/Documents/Recreation/MarshRunPark/2012_HumanHealthRiskAssessmentReport.pdf (explaining that the "recreational user is evaluated for exposure to surface soil within the recreational fields" whereas the "adolescent trespasser receptor is evaluated for exposure to surface soil"); O'BRIEN & GERE, REVISED REPORT: HUMAN HEALTH RISK ASSESSMENT: WASTEBEDS 1 THROUGH 8 SITE GEDDES, NEW YORK 39 (2011), https://www.dec.ny.gov/docs/remediation_hudson_pdf/hrawsbds1th8.pdf (distinguishing "transient older child trespasser," "adult lunchtime trespasser," "trespassers/ATV recreators," "state fairgrounds attendee" and other scenarios).

[76] 40 C.F.R. § 300.430(d)(4).

[77] 1991 EPA Directive, *supra* note 41 at 3-4 (1991).

[78] *Id.* at 6.

OU1 presents unacceptable cumulative lifetime excess cancer risk. The standard for cumulative lifetime excess cancer risk is 1 x 10^{-4}, or one chance in ten thousand[79] and the EPA's "target range" for cumulative cancer risk is between 1 x 10^{-4} and x 10^{-6} (or one chance in one million).[80] The HHRA uses 1 x 10^{-4}—the least protective allowed under CERCLA and the NCP.[81] Even under this most lax standard, multiple exposure scenarios in the HHRA exceed the cumulative excess lifetime cancer risk threshold.[82] For example, future residents or on-site indoor workers would be exposed to indoor vapors impacted by contaminants in the soil and groundwater,[83] leading to excess cancer risks above the permitted threshold.[84]

OU1 also presents unacceptable risk based on chemical-specific standards, such as non-zero maximum contaminant level goals ("MCLGs") and maximum contaminant levels ("MCLs").[85] A decision to take no further action must include the comparison of exposure concentrations to chemical-specific standards.[86] The EPA identified at least two contaminants present at levels above Regional Screening Level ("RSL"), which are based on the more protective 1 x 10^{-6} risk threshold.[87] In the Treated Wood Storage Area, benzo(a)pyrene was measured at levels as high as 6,400ug/kg compared to an RSL of 110ug/kg, and benzo(b)fluoranthene was measured as high as 12,900ug/kg compared to an RSL of

---

[79] *See id.* at 4; *see also* HHRA, *supra* note 46 at 60.
[80] *See* 1991 EPA Directive, *supra* note 41 at 4; 40 C.F.R. § 300.430(e)(2)(i)(A)(2).
[81] *See* HHRA, *supra* note 46 at 60.
[82] *See id.* at Table 2-17a (child resident – groundwater), Table 2-17c (child resident – pond area), Table 2-18a (adult resident – groundwater), Table 2-18c (adult resident – pond area), Table 2-19a (lifetime resident, mutagenic carcinogens – groundwater), Table 2-19b (lifetime resident, mutagenic carcinogens – process area), Table 2-19c (lifetime resident, mutagenic carcinogens – pond area), Table 2-21a (outdoor worker – groundwater), Table 2-22 (indoor worker – groundwater), Table 2-24 (VISL or vapor intrusion for resident or indoor worker), Table 3-1a (summary of receptor risks and hazards for COPCs – child resident), Table 3-1b (summary of receptor risks and hazards for COPCs – adult resident), Table 3-1c (summary of receptor risks and hazards for COPCs – mutagenic resident), Table 3-1d (summary of receptor risks and hazards for COPCs – lifetime resident), Table 3-1f (summary of receptor risks and hazards for COPCs – outdoor worker), Table 3-1g (summary of receptor risks and hazards for COPCs – indoor worker), Table 3-2 (summary of exposure area risks and hazards for COPCs).
[83] *See id*. at 38.
[84] *See id.* at Table 2-24.
[85] *See* 1991 EPA Directive, *supra* note 41, at 4.
[86] *See id.* at 6.
[87] *See* HHRA, *supra* note 46, at Table 2-2 n.3 (PDF 117); *Risk Assessment Regional Screening Levels (RSLs) – User's Guide*, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (Nov. 2019), https://www.epa.gov/risk/regional-screening-levels-rsls-users-guide (last visited Dec. 6, 2019).

1,100ug/kg.[88] Similarly, in the Untreated Wood Storage Area benzo(a)pyrene was measured at levels as high as 13,000ug/kg and benzo(b)fluoranthene as high as 39,000ug/kg.[89] These contaminant-specific concentrations make no further action inappropriate.

Accordingly, active remediation is required, and a feasibility study is required to analyze cleanup options that will eliminate unreasonable risk. When action is required, a cleanup should achieve the more protective 1 x 10^{-6} risk threshold, rather than defaulting to the least protective alternative.[90]

4. Sampling following the HHRA indicates that the worst contamination at OU1 is concentrated and targeted remediation could make it safe for additional uses.

During the remedial investigation phase of a CERCLA response action, the EPA may divide a Superfund site into operable units to facilitate cleanup.[91] An "operable unit" is "a discrete action that comprises an incremental step toward comprehensively addressing site problems."[92] It "may address geographical portions of a site, specific site problems, or initial phases of an action, or may consist of any set of actions performed over time or any actions that are concurrent but located in different parts of a site."[93] The stated regulatory purpose of dividing a site into operable units is to reduce risk quickly, make it easier to analyze and clean up a large or complex site, or to expedite the overall cleanup.[94] Operable units are often defined by geography, the contaminants present, or the remediation activities required.[95]

The draft FS for OU1 assessed an operable unit of 32 acres comprising the "Treated, and Untreated Wood Storage Areas located north of the fence line."[96] The Proposed Plan for OU1 addresses a smaller 21.6-acre parcel that includes only the northern portions of the treated and

---

[88] *See* HHRA, *supra* note 46 at Table 2-2.
[89] *See id*.
[90] *See* 1991 EPA Directive, *supra* note 41 at 4; 40 C.F.R. § 300.430(e)(2)(i)(A)(2).
[91] 40 C.F.R. § 300.430(a)(1)(ii)(A).
[92] *Id.* § 300.5.
[93] *Id.*
[94] *Id.* § 300.430(a)(1)(ii)(A); *see also id.* § 300.5.
[95] *See Union Carbide Corp. v. Thiokol Corp.*, 890 F. Supp. 1035, 1043 (S.D. Ga. 1994).
[96] EarthCon, DRAFT Focused Feasibility Study Report: Operable Unit 1 at 8 (2019), attached hereto as Attachment A (hereinafter "DRAFT FS FOR OU1").

untreated wood storage area, identified as areas 1A, 1B, and 2.[97] In supplemental August 2019 sampling conducted after the HHRA was finalized in April, the Multistate Trust's consultant concluded that "the overall risk from soil is acceptable for the reasonably anticipated future land use (i.e., commercial, industrial or recreational) for Areas 1A, 1B, 1C, 1D and 2," although "the overall risk from soils is unacceptable for lifetime residents in Area 1C based on exceedance of the target risk of 1 x 10^{-4}."[98] It further concluded that no FS was required for any of these five areas.[99]

As explained in greater detail in the attached expert memorandum, (1) the decision to shrink OU1 is arbitrary (2) the non-uniform distribution of PAHs in Area 1B creates opportunity for cost effective remediation (3) targeted remediation would allow unrestricted uses of the property in the future (4) recreational users potential exposures are not adequately considered in any of the scenarios in the risk assessment addendum.[100]

B. The EPA did not prepare a final feasibility study or analyze cleanup alternatives prior to the Proposed Plan.

Because the EPA failed to meet the standard for a No Action remedy here, the NCP requires it to complete an FS.[101] The feasibility study is required to examine potential cleanup actions to ensure that "appropriate remedial alternatives are developed and evaluated."[102] The selected remedy should protect human health and the environment, maintain protection over time, and minimize untreated waste.[103]

---

[97] PROPOSED PLAN FOR OU1, *supra* note 48 at 4.
[98] EarthCon, 2019 Soil Sampling Technical Memorandum Kerr-McGee Chemical Corp – Navassa Superfund Site, Navassa, North Carolina 12 (2019).
[99] *Id.*
[100] Expert Memorandum of John H. Pardue, Ph.D., P.E. (2019), attached hereto as Attachment B.
[101] 40 C.F.R. §§ 300.430(e).
[102] *Id.* § 300.430(e)(1).
[103] *Id.* § 300.430(a)(1)(i).

In conducting an FS, the EPA must first establish "Preliminary Remediation Goals" (or "PRGs"), which define the "acceptable exposure levels that are protective of human health and the environment."[104] The EPA then develops a range of response alternatives that may achieve those PRGs.

In evaluating possible cleanup alternatives, the NCP provides for an initial screening based on three criteria: (1) effectiveness; (2) implementability; and (3) cost.[105] Cleanup alternatives may be eliminated if they (a) are "significantly less effective[]" at reducing toxicity, mobility, or volume through treatment, minimizing residual risks, affording long-term protection, complying with ARARs, minimizing short-term impacts, or achieving protection quickly; (b) are "technically or administratively infeasible"; or (c) provide similar effectiveness to other alternatives but at greater cost.[106]

For the remaining "viable approaches," the EPA must then conduct a "detailed analysis of alternatives,"[107] consisting of "an assessment of individual alternatives against each of nine evaluation criteria and a comparative analysis that focuses upon the relative performance of each alternative against those criteria."[108] The nine criteria are separated into three categories:

> (A) Threshold criteria. Overall protection of human health and the environment and compliance with ARARs (unless a specific ARAR is waived) are threshold requirements that each alternative *must* meet in order to be eligible for selection.
>
> (B) Primary balancing criteria. The five primary balancing criteria are long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost.

---

[104] *Id.* § 300.430(e)(2)(i).
[105] *Id.* § 300.430(e)(7)(i)-(iii).
[106] *Id.*
[107] *Id.* § 300.430(e)(9)(i).
[108] *Id.* § 300.430(e)(9)(ii).

(C) Modifying criteria. State and community acceptance are modifying criteria that shall be considered in remedy selection.[109]

Only once sufficient information has been gathered such that the EPA can compare the alternatives based on the nine evaluation criteria may the EPA proceed with its remedy selection.

Here, the EPA selected a remedy without following any of these mandatory steps. The EPA prepared a draft focused FS for OU1, but it did not enter the document into the administrative record.[110] As the EPA described in its Community Involvement Plan for the site, the Administrative Record "contains all the information used by [the EPA] to make its decision on the selection of a response action under the Comprehensive Environmental Response, Compensation, and Liability Act."[111] Therefore, the draft focused FS for OU1 does not satisfy the agency's obligation to complete an FS and an analysis of alternatives as required for a CERCLA-quality cleanup.

The EPA's failure to finalize the draft FS for OU1 violates the NCP. When the results of the baseline risk assessment indicate that the site poses little or no threat to human health or the environment, the EPA may scale the FS as appropriate to the site and its potential hazard, or even eliminate it altogether—making the results of the RI and the baseline risk assessment the

---

[109] *Id.* § 300.430(f)(1)(i); *see id.* § 300.430(e)(9)(iii).

[110] *See Superfund Site: KERR-MCGEE CHEMICAL CORP – NAVASSA NAVASSA, NC Administrative Records*, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.ars&id=0403028&doc=Y&colid=66131&region=04&type=AR (last visited Dec. 6, 2019); PROPOSED PLAN FOR OU1, *supra* note 48, at 16 (stating, "[b]ased on current and future expected land use (i.e., non-residential) , no exposure area requires additional evaluation in the following step of the CERCLA process, the Feasibility Study."); HHRA, *supra* note 46 at 81 ("Based on the results of the HHRA, the overall risk from soil is acceptable for the reasonably anticipated future land use (i.e., industrial/commercial and recreational), except for the Pond Area and Process Area. Based on current and future expected land use (i.e., non-residential), the Pond Area and Process Area require additional evaluation in the following step of the CERCLA process, the FS.").

[111] *See Superfund Site: KERR-MCGEE CHEMICAL CORP – NAVASSA NAVASSA, NC Administrative Records*, https://semspub.epa.gov/work/04/11134955.pdf, Community Involvement Plan at 40 (last visited Dec 6, 2019); *see also* 40 C.F.R. § 300.800 (explaining that after selecting the final remedy, the EPA must "establish an administrative record that contains the documents that form the basis for the selection of a response action.").

primary means of documenting a No Action decision.[112] However, as discussed above, the results of the HHRA do *not* indicate that OU1 poses little or no threat to human health or the environment. To the contrary, cumulative cancer risk exceeds the10 x 10^{-4} threshold for multiple exposure scenarios and contaminants exceed chemical-specific standards. Accordingly, an FS is required.

Although it is incomplete, the draft FS for OU1 indicates that the EPA had been headed in the right direction with its analysis of alternatives. The draft FS states that a "no action" alternative fails to meet any of the nine "detailed analysis" criteria[113] and it anticipates that this alternative "would not be accepted by the regulatory agencies or the community, nor would it be consistent with future redevelopment of OU1."[114] The EPA should finalize the draft FS and abandon its planned No Action alternative.

C. The proposed remedy violates the NCP requirement that it meet federal and state cleanup standards.

In addition to prescribing the process for evaluating remedial alternatives in the FS, the NCP also specifies the outcome of the analysis. The selected remedy must meet five requirements:

(1) "[e]ach remedial action selected shall be protective of human health and the environment";

(2) each remedial action *must meet identified ARARs* and may be required to be updated to meet future ARARs;

---

[112] U.S. ENVT'L PROT. AGENCY, GUIDANCE FOR CONDUCTING REMEDIAL INVESTIGATIONS AND FEASIBILITY STUDIES UNDER CERCLA (EPA/540/G-89/004, OSWER Directive 9355.3-01) at 3-23 (1988), https://nepis.epa.gov/Exe/ZyNET.exe/10001VGY.TXT?ZyActionD=ZyDocument&Client=EPA&Index=1986+Thru+1990&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5Czyfiles%5CIndex%20Data%5C86thru90%5CTxt%5C00000003%5C10001VGY.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL; *see also* 1991 EPA Directive, *supra* note 41 at 6.
[113] DRAFT FS FOR OU1, *supra* note 96 at 29-30, 33-35.
[114] *Id.* at 35.

(3) a remedial action that does not meet an ARAR may be selected only if one of six enumerated waivers applies;

(4) each remedial action must be cost-effective—meaning that its "costs are proportional to its overall effectiveness"—*provided that it first satisfies the threshold criteria*; and

(5) each remedial action must "utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable."[115]

The proposed remedy violates at least three of these requirements.

First, the proposed remedy will not protect human health and the environment. As discussed above, OU1 presents excessive cumulative cancer risk and contaminants exceed chemical-specific standards, making no further action inappropriate.

Second, the proposed remedy will not meet identified ARARs. To begin with, the EPA failed to identify any ARARs in the RI, FS, or Proposed Plan, although doing so is required: "alternatives *shall* be assessed to determine whether they attain [ARARs]."[116] The draft FS for OU1—which is not part of the administrative record—states that ARARs are "TBD."[117] ARARs are not identified elsewhere in the administrative record. Presumably, the EPA has not identified ARARs for the same reason that it did not finalize the draft FS for OU1, because it mistakenly concluded that the baseline risk assessment and comparison of exposure concentrations to chemical-specific standards indicate no unacceptable risks.[118]

---

[115] 40 C.F.R. § 300.430(f)(1)(ii); *see* 42 U.S.C. § 9621(d) (degree of cleanup); *see also* 42 U.S.C. § 9621(b)(1) ("The President shall select a remedial action that is protective of human health and the environment, that is cost effective, and that utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.").

[116] 40 C.F.R. § 300.430(e)(9)(iii)(B).

[117] DRAFT FS FOR OU1, *supra* note 113 at 19.

[118] *See* 1991 EPA Directive, *supra* note 41 at 6 (explaining that if baseline risk assessment and comparison of exposure concentrations to chemical-specific standards indicates no unacceptable risks to human health or the environment and that no remedial action is warranted, "then the CERCLA Section 121 cleanup standards for selection of a Superfund remedy, including the requirement to meet applicable or relevant and appropriate requirements (ARARs), are not triggered").

Compliance with ARARs is a crucial part of a CERCLA-quality cleanup. CERCLA provides that if any contaminant will remain onsite, the remedial action must require "a level or standard of control for such hazardous substance or pollutant or contaminant which at least attains such legally [ARAR]."[119] These ARARs include "any standard, requirement, criteria, or limitation under any Federal environmental law, including, but not limited to, the Toxic Substances Control Act, the Safe Drinking Water Act, the Clean Air Act, the Clean Water Act, the Marine Protection, Research and Sanctuaries Act, or the Solid Waste Disposal Act."[120] ARARs also include any promulgated state standard that is more stringent than the federal standard and that has been identified by the state.[121] The EPA may not select a remedy that does not meet ARARs unless a waiver applies.[122] Notwithstanding its failure to identify applicable ARARs, the EPA itself has conceded that taking no action at OU1 would violate this principle. To be sure, in its evaluation of the No Action alternative in its draft FS for OU1, the EPA concluded: "Based on the current and anticipated future land use (commercial/industrial/recreational), this alternative does not achieve the Remedial Action Objective ("RAO") or chemical-specific ARARs established for the Site. Location and action-specific ARARs do not apply to this alternative since remedial actions will not be conducted."[123]

Third, permanent solutions are practicable. Namely, as the draft FS for OU1 recognized, removal and disposal of contaminated soil from OU1 is eminently is highly implementable: it "uses well-established techniques and technologies and does not require specialized services or equipment," and "[t]here are no known challenges to completing this alternative that cannot be addressed through proper engineering design and construction."[124] This solution would cost approximately $3,082,000,[125] while there remains tens of millions in trust money dedicated for remediation at the site before Superfund funding is required.

---

[119] 42 U.S.C. § 9621(d)(2)(A).
[120] *Id.* § 9621(d)(2)(A)(i).
[121] *Id.* § 9621(d)(2)(A)(ii)
[122] *Id.* § 9621(d)(4); 40 C.F.R. § 300.430(f)(1)(ii)(C).
[123] DRAFT FS FOR OU1, *supra* note 113 at 29.
[124] *Id.* at 31.
[125] *Id.*

That the EPA failed to conduct an FS or evaluate cleanup alternatives as required by the NCP is fatal to the EPA's No Action decision here.

D. Taking "no further action" at OU1 does not constitute a CERCLA-quality cleanup.

CERCLA and the NCP establish a preference for active remedies, meaning remedial actions that protect human health and the environment by affirmatively reducing the toxicity, mobility, or volume of the hazardous substances, pollutants, or contaminants.[126] Passive "institutional controls" may be used "where necessary" but "shall not substitute for active response measures (e.g., treatment and/or containment of source material, restoration of ground waters to their beneficial uses) as the sole remedy unless such active measures are determined not to be practicable, based on the balancing of trade-offs among alternatives that is conducted during the selection of remedy."[127] Because active measures are practicable, taking no further action here violates the NCP.

Furthermore, if a remedial action "results in *any* hazardous substances, pollutants, or contaminants remaining at the site," then the action must be reviewed at least every five years after it is implemented to determine whether further action is required, and the results of these reviews must be reported to Congress.[128] A remedial action also must be reviewed at least every five years if it leaves the site contaminated "above levels that allow for unlimited use and unrestricted exposure."[129] Failing to employ active measures to remediate the Kerr-McGee site will result in mandatory monitoring indefinitely.

E. The EPA and the Multistate Trust must carry out a cleanup at least as protective as CERLCA requires.

The purpose of the Multistate Trust is to own and manage certain contaminated sites, "manage and/or fund implementation of future Environmental Actions approved by the Lead Agencies," fulfill various other obligations, pay oversight costs, and ultimately to sell or

---

[126] 42 U.S.C. § 9621(b)(1) ("Remedial actions in which treatment which permanently and significantly reduces the volume, toxicity or mobility of the hazardous substances, pollutants, and contaminants is a principal element, are to be preferred").
[127] 40 C.F.R. § 300.430(a)(1)(iii)(D).
[128] 42 U.S.C. § 9621(c) (emphasis added).
[129] 40 C.F.R. § 300.430(f)(4)(ii).

otherwise dispose of the sites.[130] "Environmental Actions" means "any and all environmental activities *authorized or required* under Environmental Laws . . . including but not limited to response or remedial actions . . . ."[131] "Environmental Laws" means "all federal, tribal, state and local statutes, regulations, ordinances and similar provisions . . . including . . . CERCLA."[132] Accordingly, the Multistate Trust must conduct a cleanup at least as comprehensive as CERCLA requires and it is authorized to do more.[133] A CERCLA-quality cleanup is the obligatory floor of action by the Multistate Trust and the EPA.

In Navassa, the Multistate Trust should do better than the minimum that CERCLA requires. As a result of the Tronox settlement, the Multistate Trust received approximately $93 million to clean up the site[134] and as of fall 2017, approximately $90 million remained for remediation.[135] These funds are specifically allocated for cleanup of the Kerr-McGee site in Navassa.[136] The funds waterfall to other sites only if (1) the United States and the state in which the site is located direct the trustee to do so; (2) "based on new information" the funding allocated for a site is more than is needed; or (3) after all cleanup has been completed.[137] Accordingly, using funding allocated to cleanup at the Kerr-McGee site in Navassa for cleanup at any other site is strictly secondary to using it for cleanup at Navassa.

Although held by the Multistate Trust, the trust funds are similar to Superfund special account funds received in a settlement agreement that resolves CERCLA liability, which are

---

[130] TRONOX CONSENT DECREE, *supra* note 7 at 25-26; *see* ENVIRONMENTAL RESPONSE TRUST AGREEMENT, *supra* note 14 at 11.
[131] TRONOX CONSENT DECREE, *supra* note 7 at 12 (emphasis added); *see* ENVIRONMENTAL RESPONSE TRUST AGREEMENT, *supra* note 14 at 3.
[132] TRONOX CONSENT DECREE, *supra* note 7 at 12 (emphasis added); *see* ENVIRONMENTAL RESPONSE TRUST AGREEMENT, *supra* note 14 at 4.
[133] *See* ENVIRONMENTAL RESPONSE TRUST AGREEMENT, *supra* note 14 at 23 (enumerating powers of Multistate Trust, including "any and all acts necessary to accomplish the purposes of the Multistate Trust").
[134] OVERVIEW OF THE MULTISTATE ENVIRONMENTAL RESPONSE TRUST KERR-MCGEE CHEMICAL CORP – NAVASSA SUPERFUND SITE, NAVASSA, NORTH CAROLINA (June 2019), https://multi-trust.org/wp-content/uploads/2019/06/Kerr-McGee-Navassa-Multistate-Trust-Roles-Fact-Sheet-2019-6-25-e-FINAL.pdf (last visited Dec. 6, 2019).
[135] LETTER FROM LOUANN GROSS, CHIEF, FOIA AND RECORDS MANAGEMENT BRANCH, TO NICHOLAS JIMENEZ, SELC (2018), attached hereto as Attachment C.
[136] TRONOX CONSENT DECREE, *supra* note 7 at 28-30, 35-36, 171-72.
[137] *Id.* at 28, 43-44.

placed in site-specific accounts within the EPA's Hazardous Substance Superfund ("Superfund Trust Fund").[138] Federal guidance makes cleanup at the site that is the subject of the settlement—like the Tronox settlement—the primary purpose of settlement funds and indicates that cleanup at sites that benefit from special account funds should be *even better* than what CERCLA otherwise requires.[139]

As delineated in the Proposed Plan, OU1 comprises approximately 21.6 acres of the approximately 101.6-acre facility and 246-acre site.[140] This is approximately 21.3% of the facility and 8.9% of the whole site (including the relatively uncontaminated 82 acres of eastern upland and other areas). According to the draft FS for OU1, removing and disposing of the soil at OU1 would cost approximately $3,082,000, or approximately 3.3% of the $93 million allocated for cleanup at the site.[141] Full cleanup of OU1 is a bargain, and anything less defies the governing statutes, regulations, EPA guidance, sound public policy, and common sense.

III. FEDERAL EXECUTIVE BRANCH AND STATUTORY MANDATES TO CONSIDER DISPROPORTIONATE ADVERSE IMPACT OF ENVIRONMENTAL DECISION-MAKING ON COMMUNITIES OF COLOR REQUIRE THE MOST COMPREHENSIVE CLEAN-UP OF OU1.

A. As a Federal Agency, the EPA should act in accordance with the Environmental Justice Executive Order to reduce the stigma of Superfund site designation and incomplete clean-up.

It is well documented that a Superfund listing stigmatizes the surrounding community, which can have a negative impact on investment and growth, to the point that towns and communities often fight against being designated as a Superfund site.[142] Even more damaging

---

[138] *See* U.S. ENVT'L PROT AGENCY, UPDATED CONSOLIDATED GUIDANCE ON THE ESTABLISHMENT, MANAGEMENT, AND USE OF CERCLA SPECIAL ACCOUNTS (Aug. 5, 2019), *available at* https://semspub.epa.gov/work/HQ/100002182.pdf.
[139] *Id.* at 5 (providing model settlement language placing cleanup at the subject site first), 7 (stating that special account funds are not subject to cost caps for removal actions), 8 (providing hierarchy of uses for special account funds, placing transfer to other sites last).
[140] *See* PROPOSED PLAN FOR OU1, *supra* note 48 at 1, 4.
[141] DRAFT FS FOR OU1, *supra* note 113.
[142] *See e.g.* Scott Sonner, *Nevada wants out of Superfund listing at toxic mine*, LAS VEGAS REVIEW-JOURNAL (Sept. 7, 2017), *available at* https://www.reviewjournal.com/news/politics-and-government/nevada/nevada-wants-out-of-superfund-listing-at-toxic-mine/ (last visited Dec. 2, 2019); *see also e.g. Lawsuit filed over Triumph Mine pollution*, IDAHO MTN. EXPRESS (Oct. 9, 2018), *available at*

than a Superfund designation is a listing followed by no action at all. As stated by one group of researchers, "an expedited cleanup should occur as quickly as possible after a site has been determined to be hazardous. . . [o]therwise the neighborhoods surrounding the site will likely be stigmatized resulting in quasi-permanent economic damages."[143] These long-term economic damages should not be borne by the town of Navassa, particularly as the proposed No Action alternative would be highly discriminatory.

Unfortunately, the EPA has a history of making decisions that negatively impact minority communities. Despite the fact that "minorities and [the] poor . . .more frequently liv[e] near environmental hazards," "representation of minorities and low-income populations is lower in areas with Superfund sites, indicating these populations are not benefiting equally from the Superfund program."[144] In response to these deficiencies, the Clinton Administration issued Executive Order 12898, requiring federal agencies to implement environmental justice policies; however, the EPA has been less than diligent in applying this mandate.[145] Indeed, after the issuance of EO 12898, "there is [an] even lesser chance for Superfund listing for marginalized and poor populations" and despite "their overrepresentation in proximity to environmental hazards" minority populations continue to be ignored by the EPA.[146] The EPA's decision at the Navassa site is galling if not surprising given this history–despite identifying high concentrations of toxic chemicals in the soil, the EPA has elected not to act.

---

https://www.mtexpress.com/news/blaine_county/lawsuit-filed-over-triumph-mine-pollution/article_51e0ad32-cc0f-11e8-be09-4b84b6ca1501.html (last visited Dec. 2, 2019).

[143] William Schulze et. al., *Stigma: the Psychology and Economics of Superfund*, NAT'L SERV. CTR. FOR ENVT'L PUBS. (Jul. 2004), https://nepis.epa.gov/Exe/ZyNET.exe/900B0900.TXT?ZyActionD=ZyDocument&Client=EPA&Index=2000+Thru+2005&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5Czyfiles%5CIndex%20Data%5C00thru05%5CTxt%5C00000012%5C900B0900.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL# (last visited Dec. 2, 2019).

[144] Sandra George O'Neil, *Superfund: Evaluating the Impact of Executive Order 12898*, 115 ENVT'L HEALTH PERSP. 1087, 1087 (2007).

[145] *Id*.

[146] *Id*.

B. The State, as a supporting agency decision-maker is bound by Title VI of the Civil Rights Act of 1964 and should not authorize the No Action Alternative because that decision will have a disproportionate, adverse impact on a predominantly African-American community.

In the face of the EPA failing to act, the state must. If DEQ consents to the EPA's "no further action" alternative for OU1 it would run afoul of Title VI of the Civil Rights Act of 1964 which states that "[n]o person in the United States shall, on the ground of race, color or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance."[147] First, as a state agency receiving federal funds, DEQ must comply with Title VI and its regulations. DEQ receives significant resources from federal sources. In the 2019 fiscal year alone the department was granted $104,102,313.00 and has received over one billion dollars since fiscal year 2008.[148] The EPA has allocated funding to local non-state groups to assist in understanding this process, and may provide additional funding to the state agency to carry out duties associated with site disposition.[149]

As a town where the majority of residents are people of color, protections afforded by Title VI apply. As noted previously, the Town of Navassa is 70.6% African-American, with 22.1% of the town's population living below the poverty line.[150] The decision to authorize a No Action alternative will have a disparate adverse impact on local residents, who are most likely to use the site in the future. The EPA's proposed No Action alternative would leave OU1 contaminated with benzo(a)pyrene and creosote.[151] Anticipated future uses may include, but are

---

[147] 42 U.S.C.§ 2000d.

[148] *Recipient Profile, North Carolina Department of Environmental Quality*, USASPENDING.gov, https://www.usaspending.gov/#/recipient/bdeeea6f-68a6-ac47-5324-e90efc2c7fab-C (last visited Dec. 2, 2019).

[149] The EPA has provided $25,000 to the Navassa Community Environmental & Economic Re-development Corporation to hire technical advisors to give information to the community regarding the technical aspects of the cleanup of the Kerr-Mcgee superfund site. *Grant Summary, Project Grant FAIN 00D54217*, USASPENDING.gov, https://www.usaspending.gov/#/award/ASST_NON_00D54217_6800 (last visited Dec. 2, 2019).

[150] The Town of Navassa's population is 71% African American and 7% Hispanic. Twenty-two percent of the population is living in poverty. *See Navassa, NC*, CENSUSREPORTER.ORG, https://censusreporter.org/profiles/16000US3746060-navassa-nc/ (last visited Dec. 2, 2019).

[151] *See* PROPOSED PLAN FOR OU1, *supra* note 48.

not limited to, a cultural center, a recreational area, and light commercial use.[152] Further, there has been some community support for mixed use development, which leaves open the possibility of residential use. Although the EPA is the lead agency, the No Action alternative cannot be implemented without input from DEQ which, as the support agency, has the right to make clear its concerns with the EPA's poorly chosen plan.[153] DEQ should take advantage of this; to do otherwise will invite a Title VI challenge to the state's action in supporting the EPA's Proposed Plan.

If implemented as proposed, the EPA's No Action alternative will likely have an adverse and disproportionate impact on the local community on the basis of race, in violation of Title VI. As such, DEQ should reject this alternative and press the EPA to engage in proper clean-up efforts.

IV. THE ON-GOING PUBLIC HEALTH THREAT FROM FAILURE TO CLEAN UP THE SITE IS UNLIKELY TO BE ALLEVIATED BY A RESTRICTIVE COVENANT ON THE PROPERTY; THEREBY JUSTIFYING THE NEED FOR THE MOST COMPREHENSIVE CLEAN-UP OF OU1.

As discussed earlier in this letter, under the Proposed Plan, OU1 will contain soil contamination that is unacceptable for residential use under North Carolina law.[154] As such, DEQ has determined that institutional controls in the form of restrictive covenants will be necessary to prevent residential land use.[155] Restrictive covenants are clauses in property deeds that contractually limit how owners can use the property. They are intended to run with the land,

---

[152] *See* VISIONING WORKSHOP PRESENTATION supra note 50.

[153] *See* 42 U.S.C. § 9621(f); 40 C.F.R. § 300.430 ("The selection of a remedial action is a two-step process and shall proceed in accordance with § 300.515(e). First, the lead agency, in conjunction with the support agency, identifies a preferred alternative and presents it to the public in a proposed plan, for review and comment. Second, the lead agency shall review the public comments and consult with the state (or support agency) in order to determine if the alternative remains the most appropriate remedial action for the site or site problem."); *see also id.* § 300.515 ("Included in the proposed plan shall be a statement that the lead and support agencies have reached agreement or, where this is not the case, a statement explaining the concerns of the support agency with the lead agency's proposed plan"); *United States v. Akzo Coatings of Am., Inc.*, 949 F.2d 1409, 1418 (6th Cir. 1991) (explaining that CERLCA allows states to challenge EPA remedy decisions for failure to meet ARARs).

[154] N.C. Gen. Stat. §§ 143B-279.9(b)(1), 130A-310.3(f).

[155] *See* Proposed plan, *supra* note 48 at 17 (stating that "the NC DEQ understands that the Multistate Trust will establish permanent Institutional Controls, subject to NC DEQ approval and concurrence, to prevent residential land use on the property in the form of a restrictive covenant or covenants that meet all of the requirements of [those statutes]").

meaning the restriction continues to apply to the land when it is sold. In theory, a restrictive covenant can last indefinitely.

The requirement for a restrictive covenant is a direct result of the EPA's erroneous determination that the land in OU1 meets the EPA's criterion for a No Action Remedy based on the "current and reasonably anticipated future land uses (commercial, industrial, or recreational)."[156] Because the EPA has proposed doing absolutely nothing to remedy the contamination of the soil in the 21.6 acre OU1, North Carolina law requires a covenant to prevent residential development of this property in perpetuity.

North Carolina law restricts the current and future uses of real property when "soil contamination will remain in excess of unrestricted use standards" except by special approval by the Secretary of DEQ.[157] The term "unrestricted use standards" is defined as follows: "Cleanup or remediation of real property to unrestricted use standards means that the property is restored to a condition such that the property and any use that is made of the property does not pose a danger or risk to public health, the environment, or users of the property that is significantly greater than that posed by use of the property prior to its having been contaminated." In that the EPA, in its Proposed Plan, intends to do *nothing* to remediate the soil contamination, there is no doubt that this statute applies.[158]

NCGS § 130A-310.3(f) further supports the need for restrictive covenants on contaminated properties in North Carolina: "In order to reduce or eliminate the danger to public health or the environment posed by an inactive hazardous substance or waste disposal site, an owner, operator, or other responsible party may impose restrictions on the current or future use of the real property comprising any part of the site if the restrictions meet the requirements of this subsection."

Restrictive covenants are a form of "institutional control," which is defined in the Proposed Plan as a "Restriction that prevents an owner inappropriately developing a property.

---

[156] *See* PROPOSED PLAN FOR OU1, *supra* note 48, at 18.
[157] N.C. GEN. STAT. § 143B-279.9(b)(1).
[158] N.C. GEN. STAT. § 143B-279.9(d)(1).

The restriction is designed to reduce exposure to hazardous substances to workers or the general public and maintain the integrity of the remedy."[159]

The use of institutional controls has grown in recent decades as a push for urban renewal has led to the redevelopment of abandoned industrial sites, due to the fact that institutional controls are cheaper and faster than actual cleanup.[160] Institutional controls are "premised on the notion that by limiting exposure to hazardous substances through land use restrictions, the same amount of protection of human health and the environment can be achieved without undertaking costly and time-consuming cleanups."[161]

A cursory review of academic literature on the subject makes clear that institutional controls can and do fail. The most famous example, though it predates CERCLA and the term "institutional control," is Love Canal, where the City of Niagara Falls built a school and a residential neighborhood over a chemical dump site in 1954, despite a disclosure in the deed. Two decades later the entire Love Canal neighborhood was evacuated after heavy rainfall released chemicals onto residential properties and into local storm sewers, resulting in the first Presidential Declaration of a man-made national disaster.[162]

Predictably, the fastest and cheapest course of action is not necessarily the most effective. Enforcement, or lack thereof, is one problem with institutional controls that are based in traditional property law concepts, such as the covenants proposed here. "Federal agencies have neither the ability to create nor to enforce institutional controls when based on state property law concepts."[163] Per North Carolina law, land-use restrictions may be enforced by DEQ, any unit local government with jurisdiction over any part of the site, or any owner, operator or

---

[159] PROPOSED PLAN FOR OU1, *supra* note 48, at 20.
[160] *See* Susan C. Borinsky, *The Use of Institutional Controls in Superfund and Similar State Laws*, 7 FORDHAM ENVTL. L. REV. 1, 2 (1995); Jim Spaanstra, et al., *Institutional Controls: Brownfields Superweapon or Ultimate Trojan Horse?*, 15 NAT. RESOURCES & ENV'T. 104, 104 (2000).
[161] Patricia J. Winmill & Hal J. Pos, *Use & Enforceability of Institutional Controls in Risk-Based Environmental Cleanups—They're Cheap and Good Looking, But Will They Last?*, 49 ROCKY MTN. MIN. L. INST. 23-1, 23-5 (2003).
[162] Eckhardt C. Beck, *The Love Canal Tragedy*, E.P.A. J. 17 (Jan. 1979), https://archive.epa.gov/epa/aboutepa/love-canal-tragedy.html; *U.S. v. Hooker Chemicals & Plastics Corp. (Hooker Plastics)*, 850 F. Supp. 993, 1005 (W.D.N.Y. 1994).
[163] Sarah Fox, *CERCLA, Institutional Controls, and the Legacy of Urban Industrial Use*, 42 ENVTL. L. 1211, 1238 (2012).

responsible party for the site.[164] In addition, although restrictive covenants are intended to "run with the land," and although North Carolina law requires such,[165] there is little case law on which to rely to support this assumption.[166] Agencies should be wary of depending on clean-up solutions where the longevity of the control is uncertain.

Institutional controls also fail due to the inadequacy of the control used to justify skirting clean-up, or to improper implementation of adequate controls.[167] Indeed, as Love Canal illustrates, it is the failure of institutional controls that spurred the development of Superfund law in the first place. The price of failed institutional controls can be steep, including "exposure to hazardous substances and incurrence of additional cleanup costs, legal costs, opportunity cost, environmental racism, increased risk of liability, and potential costs to the environment."[168] In this case, where the cost of clean-up would be only a fraction of the funding available for the project as a whole, the possibility of failure seems too great a risk to take.

Additionally, research has found that institutional controls stigmatize nearby land, reducing property values,[169] and that remediating contaminated properties almost completely

---

[164] N.C. GEN. STAT. § 130A-310.3(f).
[165] N.C. GEN. STAT. §143B-279.10(e).
[166] Jim Spaanstra et al., *Institutional Controls: Brownfields Superweapon or Ultimate Trojan Horse?*, 15 NAT. RESOURCES & ENV'T 104, 106 (2000).
[167] The National Research Council has found that "failures [with institutional controls] are likely to occur, possibly in the near term, and that humans and environmental resources willbe put at risk as a result." NAT'L RESEARCH COUNCIL, LONG-TERM INSTITUTIONAL MANAGEMENT OF U.S. DEPARTMENT OF ENERGY LEGACY WASTE SITES 97 (2000). A report by the Environmental Law Institute goes even further, concluding that "institutional controls cannot prevent harm," as "most institutional controls fail at some point or in some situations." John Pendergrass, *Institutional Controls in the States: What Is and Can Be Done to Protect Public Health at Brownfields*, 35 CONN. L. REV. 1303, 1305 (2003).
[168] Fox, *supra* note 163, at 1240; *see also*, Alex Geisinger, *Rethinking Risk-Based Environmental Cleanup*, 76 IND. L.J. 367, 371 (2001) ("Use restricted cleanup programs cannot ensure that property use will not change in a way that will result in exposure routes greater than those anticipated by the cleanup. Existing programs thus fail to ensure that a cleanup will be protective of human health and the environment.").
169 *See, e.g.*, Jill McCluskey and Gordon Rausser, *Stigmatized asset value: Is it temporary or long-term?*, 85 REV. OF ECON. & STATISTICS 276, 276-285 (2003), https://www.mitpressjournals.org/doi/10.1162/003465303765299800; Kent Messer, et al., *Can stigma explain large property value losses? The psychology and economics of superfund*, 33 ENVTL & RES. ECON. 299, 299-324 (2006), https://link.springer.com/article/10.1007/s10640-005-3609-x.

removes the stigma.[170] Federal and state agencies should be taking all possible steps to avoid further burdening the residents of Navassa. Taking no action will likely depress local property values, whereas remediating the contamination would protect property values, and would likely increase property values as the contaminated land became available for residential or mixed use development.

North Carolina should not establish a restrictive covenant on the OU1 property until a final decision regarding cleanup has been made. Federal law, with its high tolerance for cancer risk, does not require a restrictive covenant. Although we support North Carolina's requirement that a restrictive covenant be in place to prevent the residential development of contaminated property, we urge DEQ to wait for a final plan, and remain hopeful that EPA will choose a course of action that remediates the contamination of OU1 and renders restrictive covenants on this property unnecessary.

V. THE COMMUNITY NEED FOR ADDITIONAL HOUSING IN THE WAKE OF THREE DEVASTATING HURRICANES SHOULD OBLIGATE THE EPA AND THE MST TO CARRY OUT THE MOST COMPREHENSIVE CLEAN-UP OF OU1.

Major hurricanes in recent years, including Matthew, Florence, and Dorian, greatly exacerbated the housing crisis as well as dramatically changed the real estate landscape in terms of available housing in coastal North Carolina. Clean-up of the Navassa site to residential standards provides an opportunity for additional housing to ease the coastal shortage. The following sections will address the background of the housing crisis in southeastern North Carolina, the impact of hurricanes, the slow post-hurricane recovery continuing today, and the potential for multi-family units in Navassa.

---

[170] Laura Taylor, et al., *Disentangling the Property Value Impacts of Environmental Contamination from Locally Undesirable Land Uses: Implications for Measuring Post-Cleanup Stigma*, 93 J. OF URBAN ECON 85 (April 2016) ("we find little evidence of stigma effects once a contaminated site is remediated."), https://www.sciencedirect.com/science/article/abs/pii/S0094119016000243.

A. Hurricane Florence, Matthew and Dorian exacerbated the housing crisis in coastal North Carolina.

An immense housing shortage existed in coastal North Carolina well before this trio of storms decimated the region. Prior to Florence, the Wilmington area had been struggling with a longstanding affordable housing shortage, with a reported 56,000 families across Brunswick, New Hanover, and Pender counties cost-burdened by housing.[171] In fact, before these hurricanes, North Carolina faced an alarming affordable housing deficit of more than 190,000 units.[172] Two major contributing factors for people buying homes on the coast include the desire to live in or near Wilmington as well as a need for housing following the destruction of Hurricane Florence. The influx of people to Wilmington over the past few years has worsened the demand for housing and heightened the affordable housing crisis.[173] The demand for housing in this region is not predicted to slow down. The population of Brunswick County is projected to increase by approximately 60,000 from 2020 to 2038, [174] and Brunswick, New Hanover, and Pender counties are expected to see a collective 90% increase in population from 2015-2040. [175,] Thus, the current affordable housing deficit will likely continue to escalate.

Hurricane Florence dramatically intensified the available housing crisis in southeastern North Carolina, and especially in Brunswick County. While recovery from Florence is ongoing,

---

[171] Adam Wagner, *Hurricane Florence, A Year Later: Many North Carolinian's Lack Resources to Recover,* INS. J. (Sept. 25, 2019), https://www.insurancejournal.com/news/southeast/2019/09/25/541080.htm.

[172] Kirk Ross and Frances Stead Sellers, *As North Carolina focuses on getting ahead of hurricanes, some residents are hesitant to move,* THE WASHINGTON POST (Sept. 4, 2019), https://www.washingtonpost.com/national/as-north-carolina-focuses-on-getting-ahead-of-hurricanes-some-residents-are-hesitant-to-move/2019/09/04/f7bd88b6-cb36-11e9-a1fe-ca46e8d573c0_story.html.

[173] *See* Michael Praats, *Hurricane Florence, the 'missing middle,' and government incentives: Councilman Paul Lawler weighs in on affordable housing in Wilmington,* PORT CITY DAILY (March 4, 2019), https://portcitydaily.com/local-news/2019/03/04/hurricane-florence-the-missing-middle-and-government-incentives-councilman-paul-lawler-weighs-in-on-affordable-housing-in-wilmington/ (including Wilmington City Councilman Paul Lawler's statements on Hurricane Florence's impacts on housing demand.).

[174] *County/State Population Projections,* NC BUDGET AND MANAGEMENT, https://www.osbm.nc.gov/demog/county-projections (last visited Dec. 2, 2019).

[175] *See* Michael Praats, *Hurricane Florence, the 'missing middle,' and government incentives: Councilman Paul Lawler weights in on affordable housing in Wilmington,* PORT CITY DAILY (March 4, 2019), *available at* https://portcitydaily.com/local-news/2019/03/04/hurricane-florence-the-missing-middle-and-government-incentives-councilman-paul-lawler-weighs-in-on-affordable-housing-in-wilmington/

other hurricanes continue to make landfall on North Carolina's coast. After this year's Hurricane Dorian brought life-threatening storm surges and flooding to many coastal cities, Governor Cooper lamented that North Carolina is currently struggling to recover from three hurricanes in fewer than three years.[176] The availability of housing for people in coastal North Carolina, public infrastructure damage, and changes to the social fabric of communities due to residents leaving as a result of storm damage remain chief concerns.[177] After Hurricanes Matthew and Florence, the deficit of affordable housing in eastern North Carolina jumped from the aforementioned 190,000 units to 300,000 units.[178]

B. Post-Hurricane recovery has been slow, contributing to a continued limitation on available housing.

A closer look at the region a year after Hurricane Florence can help underscore the need for housing and how recovery has been stymied by efforts that are neither fast nor cheap. In many communities, residents are still rebuilding their homes, and apartment complexes have remained unoccupied as they undergo continued repairs.[179] In Hampstead, Leland and Burgaw, residents are still rebuilding their homes.[180] In Pender County, about 200 families are still waiting to return to their damaged homes.[181] In addition, there are ongoing repairs for nearly 100 sinkholes at more than 70 locations in Wilmington, as well as numerous projects focusing on the hardening of infrastructure to better withstand future hurricanes.[182]

---

[176] *See* Wagner, *supra* note 171 (giving Governor Cooper's response on Hurricane Florence's impact on North Carolina),
[177] See *id.* (providing comments on future recovery efforts by Ted Lord, acting president of Golden LEAF).
[178] *See* Kirk Ross and Frances Stead Sellers, *As North Carolina focuses on getting ahead of hurricanes, some residents are hesitant to move,* The Washington Post (Sept. 4, 2019), https://www.washingtonpost.com/national/as-north-carolina-focuses-on-getting-ahead-of-hurricanes-some-residents-are-hesitant-to-move/2019/09/04/f7bd88b6-cb36-11e9-a1fe-ca46e8d573c0_story.html (last visited Dec.6, 2019).
[179] Gareth McGrath, *Hurricane Florence: A recovery still in progress,* STARNEWS (Sept. 10, 2019), https://www.starnewsonline.com/news/20190910/hurricane-florence-recovery-still-in-progress.
[180] *Id.*
[181] *Id.*
[182] *Id.*

The slow recovery process is in some part due to North Carolina being at the mercy of the Federal Emergency Management Agency for the allocation of funding.[183] One year after Hurricane Florence, Governor Cooper noted that he had not yet received any federal money for housing recovery.[184] To illustrate the extent of the affordable-housing crisis, a local coastal realtor explained that prior to Hurricane Florence, a person earning minimum wage had to work 97 hours a week to afford a two-bedroom apartment, and that number is even higher today.[185] Ultimately, the post-hurricane recovery has been and continues to be a lengthy process that will require significant engagement with the community and the physical reshaping or re-purposing of an area, such as utilizing and transforming land to accommodate eastern North Carolina's increasingly urgent residential needs.[186]

C. Navassa offers potential for multi-family units to ease housing demand.

Navassa's OU1, with the best and most comprehensive clean-up, could potentially be developed for multi-family units. In the nine-county eastern North Carolina area, the current supply of available lots is 26,500, but the total market demand between 2019 and 2024 is expected to be 53,686 lots, with more than 12,000 lots needed in Brunswick County alone.[187] While before Hurricane Florence it would take about four months to build a home, housing market professionals say that today, that timeline has been delayed to six or seven months.[188] This slower construction turnaround time adds to contemporary challenges of there are simply not as many houses available, causing considerable pent-up demand.[189] Including residential use as an anticipated future land use in the Proposed Plan for OU1 would help mitigate this increasing lot shortage.

---

[183] *See id.* (providing Emergency Management Director Tom Collins' statements on the availability of funding).

[184] *See id.* (Governor Cooper's statements on the lack of received recovery funding).

[185] Gareth McGrath, *Hurricane Florence: A recovery still in progress*, STARNEWS, (September 10, 2019), https://www.starnewsonline.com/news/20190910/hurricane-florence-recovery-still-in-progress

[186] Wagner, *supra* note 171.

[187] Cece Nunn, *Experts: New Home Demand Remains*, WILMINGTONBIZ (Oct. 18, 2019), http://www.wilmingtonbiz.com/real_estate_-_residential/2019/10/18/experts_new_home_demand_remains/19538

[188] *Id.*

[189] *Id.*

VI. THE EPA PROPOSED PLANS AT OTHER KERR-MCGEE SITES IN THE SOUTHEAST INCLUDE SOIL REMOVAL; THIS PRECEDENT SHOULD DRIVE THE MOST COMPREHENSIVE CLEAN-UP OF OU1 IN NAVASSA.

A. Kerr-McGee Chemical Corporation – Columbus, MS.

The boundaries of the Kerr-McGee Chemical Corp—Columbus site, located in Columbus, Mississippi, include the former chemical manufacturing facility.[190] Businesses and neighborhoods, which include low-income and minority residents, surround the site. This site includes the area where Kerr-McGee Chemical and its successor, Tronox, operated a chemical manufacturing facility from 1928 to 2003. Like in Navassa, operators used creosote and creosote coal tar solutions to make pressure-treated wood products. The EPA added the site to the NPL in 2011 because of contaminated groundwater, sediment, and soil caused by facility operations.

In April 2019, the Record of Decision ("ROD") for the Pine Yard (Operable Unit 1) was released. Operable Unit 1 ("OU1") was used primarily for lumber storage and is zoned for mixed industrial/commercial use. The reasonably anticipated future land use of OU1 is mainly industrial/commercial, with residential use along the western boundary. Based upon consideration of the results of the site investigations, the requirements of CERCLA, the detailed analysis of the response measures, and public comments, the EPA determined that "Alternative 2: Removal and Offsite Disposal" was the appropriate remedy for the contamination found in the surface and subsurface soil in OU1, because it best satisfies the requirements of § 121 of CERCLA and the NCP's nine evaluation criteria for remedial alternatives.

The residents of Navassa deserve no less. The EPA should follow the example it set with Columbus' OU1 and remedy the contamination at Navassa's OU1.

---

[190] *Superfund Site: Kerr-McGee Chemical Corporation*, U.S. ENVT'L PROT. AGENCY, https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.Cleanup&id=0402489 (last visited Dec. 5, 2019).

B. Camilla Wood Preserving Company – Camilla, GA.

The 54-acre Camilla Wood Preserving Superfund site is located in Camilla, Georgia, which has similar demographics to Navassa.[191] The African-American population in Camilla is 72.3%[192] with 32.58% of the town's population living below the poverty line.[193] From 1947 until 1991, wood-preserving activities at the site contaminated soil and groundwater. The EPA performed investigations and short-term cleanups at the site between 1991 and 2007. Cleanup activities included treatment and disposal of wastewater, construction of a fence around the site, removal of contaminated soil from the western part of the site, and removal of contaminated equipment and debris. The removal of this contaminated soil, through such efforts of soil excavation and remediation to meet recreational standards, allowed the City of Camilla to redevelop approximately 25 acres into soccer fields and a recreation complex in 2007.[194] Site reuses also include an aerobics classroom, office space for Mitchell County's Parks & Recreation Department, a concession stand, and parking areas. The EPA added the site to the NPL in 1998. Additional cleanup activities are underway to address contamination on the eastern part of the site.

The City of Camilla used Superfund Redevelopment Initiative Pilot funding to commission a reuse planning process and to share the results with the EPA. The City worked with a community-based land use committee and a consultant team to develop a reuse plan. The Committee determined that the site would be an ideal location for a soccer complex. It also identified other recreational needs of the local community. This updated reuse plan informed the EPA's planned removal action for the western part of the site.[195]

---

[191] *Superfund Site: Camilla Wood Preserving Company*, U.S. ENVT'L PROT. AGENCY, https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0401395 (last visited Dec. 2, 2019)
[192] CAMILLA, GA, DIVERSITY, DATA USA, https://datausa.io/profile/geo/camilla-ga/#demographics (last visited Dec. 6, 2019).
[193] CAMILLA, GA, DATA USA, https://datausa.io/profile/geo/camilla-ga/, (last visited Dec. 6, 2019),
[194] *Camilla Wood Preserving Company*, TOXICSITES, http://www.toxicsites.us/site.php?epa_id=GAD008212409 (last visited Dec. 5, 2019).
[195] Clean Up Information Network (CLU-IN), Superfund Redevelopment Initiative Webinar Series: Aligning Remedies with Reuse: From Superfund Sites to Soccer Fields, January 25, 2012, https://clu-in.org/conf/tio/sri_012512/prez/sri_012512bw.pdf.

In 2012, the EPA awarded the City of Camilla and Mitchell County the Region 4 Excellence in Site Reuse award for outstanding efforts to redevelop a Superfund site. The City and County have drawn up initial plans for more recreational uses at the site. Future uses include basketball courts, baseball fields, batting cages, a playground, picnic tables and a volleyball court. Walking and biking trails could also be extended across the entire site and connect to downtown Camilla after cleanup is complete.

Navassa should be afforded the opportunity for award winning programming that follows a robust clean-up. For these and other reasons, the EPA should abandon the No Action plan and move forward with the most robust clean-up possible, including the removal of contaminated soil.

VII. RECOGNITION OF GULLAH-GEECHEE HERITAGE, AND THE FUTURE USE OF THE LAND NEAR THE OU1 AS A CULTURAL HERITAGE AND NATURAL RESOURCE CONSERVATION SITE SHOULD DRIVE THE EPA TO CONDUCT THE MOST COMPREHENSIVE CLEAN-UP OF OU1.

Gullah-Geechee culture is an integral part of the history and heritage of the Town of Navassa. The town is located within the Gullah-Geechee Cultural Heritage Corridor ("the Corridor"), which stretches from Wilmington, North Carolina, in the north to Jacksonville, Florida, in the south.[196] The Corridor was established by Congress with the passage of the National Heritage Areas Act of 2006.[197] Through this designation, Congress has recognized that the Corridor is a place that "tells a *nationally important* story through its geography, its natural and cultural resources, and the traditions that have evolved within the landscape."[198]

The Gullah-Geechee hold deep traditional ties to their natural environment. In fact, "the income and livelihood of farmers, sweetgrass basket makers, fishermen, and crabbers, to name just a few, are inextricably linked to the land and water. Therefore, the importance of healthy

---

[196] *Gullah/Geechee A Unique African American Culture*, U.S. NAT'L PARK SERV., https://www.nps.gov/guge/index.htm (last visited Dec. 2, 2019).
[197] Pub. L. No. 109-338.
[198] NATIONAL PARK SERVICE, GULLAH-GEECHEE CULTURAL HERITAGE CORRIDOR COMMISSION, GULLAH-GEECHEE CULTURAL HERITAGE CORRIDOR MANAGEMENT PLAN 6 (2012), https://docs.wixstatic.com/ugd/ab25ce_bb26c08823544f66bb61339a91a0cb58.pdf (emphasis added).

and functioning ecosystems is critical to maintaining the quality and way of life of Gullah-Geechee people."[199]

The work of preserving Navassa's unique cultural heritage has already begun, but will continue to require support. In 2016, the Z. Smith Reynolds Foundation awarded the North Carolina Coastal Land Trust and the Town of Navassa a $25,000 grant to explore opportunities to preserve Navassa's Gullah-Geechee heritage. Specifically, the grant funded the development of a concept plan for a Gullah-Geechee cultural center and a concept plan for a program to protect lands near Navassa that are significant to Gullah-Geechee heritage.[200] Lands likely to be considered for conservation include those that contain or once contained rice canals, rice cultivation, or Gullah-Geechee graveyards.[201]

The Town has already identified a potential location for the proposed Gullah-Geechee Cultural Center. In response to a 2015 request for projects, the Land Management Group—acting with the Town of Navassa—submitted a proposal for a project to be known as the Moze Heritage Center and Nature Park. The proposed 40-acre project would be located on a portion of the Kerr-McGee site, adjacent to OU1, and would protect locally significant habitats, while also offering cultural, recreational, and educational benefits to the community. The Town intends to include a Gullah-Geechee Cultural Center in the project in order to celebrate its Gullah-Geechee heritage. The Cultural Center would likely play a major role in another mission of the proposed project: to educate visitors about the interconnection between the community's cultural heritage and its natural resources.

In October of this year, the Navassa Trustee Council, made up of representatives from DEQ, the National Oceanic and Atmospheric Administration, and the U.S. Fish and Wildlife Service selected this natural resources restoration proposal, from the Town of Navassa, to assist

---

[199] *Id.* at 95.
[200] Press Release, Z. Smith Reynolds Foundation, ZSR Awards $25,000 to NC Coastal Land Trust (Mar. 15, 2016), https://www.zsr.org/articles/zsr-awards-25000-nc-coastal-land-trust.
[201] Lynda Van Kuren, *Navassa, Coastal Land Trust Get Grant for Gullah-Geechee Preservation*, STARNEWS, Mar. 14, 2016, http://www.starnewsonline.com/news/20160314/navassa-coastal-land-trust-get-grant-for-gullah-geechee-preservation.

in funding the foundations of the Gullah-Geechee Nature Park. The Park will be directly adjacent to OU1.

The Moze proposal is the product of public participation, based on input with community members, and contains components for environmental restoration that would benefit the entire town. Such components include "the enhancement of riverine swamp forest along the northeastern portion of the site and the enhancement and preservation of high marsh via the rehabilitation of historic rice field dikes."[202] Proposed marsh preservation would protect commercial fisheries that are vital to the region and would provide refuge for species of concern, such as the black rail.[203] Moreover, rehabilitated historic rice field docks would address salt-water intrusion and sea-level rise issues.[204] A proposed viewing dock and walking trails would highlight natural heritage resources that continue to provide value to Navassa and its surrounding areas.[205] Finally, the Gullah-Geechee Cultural Center would highlight the area's rich African-American history.[206]

In addition to the establishment of a Gullah-Geechee Cultural Center, Navassa residents have expressed interest in several other ways it may preserve and celebrate their Gullah-Geechee heritage. For example, they have suggested programs to protect and enhance traditional practices such as rice cultivation and oyster farming – both of which have been practiced by the Gullah-Geechee for several generations. Residents have also suggested working to preserve the community's vibrant tradition of locally sourced food—another reflection of the Gullah-Geechee's traditional reliance on and connection with their natural environment. Observation of the significance of the Gullah-Geechee Culture and the proximity of the site to OU1, dictate an actual clean-up plan, rather than the EPA's current proposal to do nothing at all.

---

[202] N.O.A.A., DRAFT RESTORATION PLAN: KERR-MCGEE CHEMICAL CORP. SITE, NAVASSA, N.C. (OCT. 2019), , https://pub-data.diver.orr.noaa.gov/admin-record/6102/Kerr-McGee_Draft_RP-EA_2019_approved.pdf (last visited Dec. 6 2019).
[203] *Id.*
[204] *Id.*
[205] *Id.*
[206] *Id.*

VIII. BY IGNORING THE IMPACTS OF CLIMATE CHANGE, THE PROPOSED PLAN UNDERESTIMATES THE RISKS ASSOCIATED WITH TAKING NO FURTHER ACTION TO CLEAN UP THE SITE.

The Kerr-McGee site is vulnerable to multiple climate change-related risks. The U.S. Government Accountability Office ("GAO") recently completed an audit of non-federal Superfund sites in which it concluded that approximately sixty percent may be impacted by natural hazards that may be exacerbated by climate change.[207] According to GAO's analysis, which relies on the Fourth National Climate assessment, data from the National Oceanic and Atmospheric Administration and other federal sources, the Kerr-McGee site is vulnerable to a minimum intensity (Category 1) hurricane; has the highest flood hazard; is vulnerable to flooding at high tide with no additional sea level rise; and has high wildfire potential.[208] Sea level rise and storm surges from severe storms are projected to continue to worsen.[209]

These climate change-related impacts will put the Navassa community at greater risk from the contamination at OU1 in multiple ways. To take the most obvious example, the floodwaters that accompany hurricanes typically contain a wide variety of contaminants,

---

[207] U.S. GOV'T ACCOUNTABILITY OFFICE, SUPERFUND: EPA SHOULD TAKE ADDITIONAL ACTIONS TO MANAGE RISKS FROM CLIMATE CHANGE 1 (2019), https://www.gao.gov/assets/710/702158.pdf (hereinafter "GAO CLIMATE & SUPERFUND REPORT").

[208] *Superfund Sites and Climate Change*, U.S. GOV'T ACCOUNTABILITY OFFICE, https://www.gao.gov/multimedia/GAO-20-73/interactive/ (zoom towards Wilmington and click on the dot for "Kerr-McGee Chemical Corp-Navassa) (last visited Dec. 3, 2019); *see also Flooding and Potential Environmental Contamination Sources in North Carolina*, DUKE UNIVERSITY, https://dukeuniv.maps.arcgis.com/apps/webappviewer/index.html?id=de98a2462d38434caee4b57f174f0679&marker=-77.99903215250012%2C34.2472231173755%2C%2C%2C%2C&markertemplate=%7B%22title%22%3A893%2C%22longitude%22%3A-77.99903215250012%2C%22latitude%22%3A34.2472231173755%2C%22isIncludeShareUrl%22%3Atrue%7D&level=15 (last visited Dec. 3, 2019).

[209] *See* NAT'L OCEANIC AND ATMOSPHERIC ADMIN., GLOBAL AND REGIONAL SEA LEVEL RISE SCENARIOS FOR THE UNITED STATES (2017), https://tidesandcurrents.noaa.gov/publications/techrpt83_Global_and_Regional_SLR_Scenarios_for_the_US_final.pdf (predicting sea level rise of between 1 foot and 1.5 feet in the Wilmington area by 2040 under the likely Intermediate-High scenario); U.S. GLOBAL CHANGE RESEARCH PROGRAM, FOURTH NATIONAL CLIMATE ASSESSMENT: CHAPTER 19: SOUTHEAST (2018), https://nca2018.globalchange.gov/chapter/19/ (explaining that "[h]igher sea levels will cause the storm surges from tropical storms to travel farther inland than in the past, impacting more coastal properties").

including contamination present in the soils inundated during the flood.[210] Creosote is generally denser than water and will migrate down into groundwater,[211] but this does not mean that creosote in soil will not contaminate surface floodwaters.[212] Exposure to contaminated floodwaters may follow various paths, including direct exposure and deposition of contaminated sediment.[213]

This has happened multiple times in recent memory. Remediation at the Cheraw Superfund site in South Carolina began in June 2018.[214] A few months later, flooding from Hurricane Florence spread the site's PCB pollution and contaminated nearby homes.[215] The EPA asked some residents to evacuate their property after detecting levels of contamination harmful to human health.[216] Similarly, Hurricane Harvey in 2017 damaged the cap of a Superfund site along the San Jacinto River, releasing unquantified levels of dioxin into the floodwaters.[217] Residents near a separate site along the same river smelled creosote and

---

[210] *See Addressing Environmental Health Concerns After a Hurricane*, DUKE UNIVERSITY, https://sites.nicholas.duke.edu/superfund/hurricane_resources/#sources (last visited Dec. 3, 2019); Michael Biesecker and Jason Dearen, *AP Exclusive: Toxic waste sites flooded in Houston area*, PBS.ORG (Sept. 3, 2017 10:26AM EST), https://www.pbs.org/newshour/nation/ap-exclusive-toxic-waste-sites-flooded-houston-area; Vann R. Newkirk II, *The Looming Superfund Nightmare*, THE ATLANTIC (Sept. 12, 2017), https://www.theatlantic.com/health/archive/2017/09/the-looming-superfund-nightmare/539316/.
[211] STAN FEENSTRA & JOHN A. CHERRY, U.S. ENVT'L PROT. AGENCY, GROUNDWATER CONTAMINATION BY CREOSOTE 2 (1990), https://semspub.epa.gov/work/01/463470.pdf.
[212] *See* LOUISIANA OFFICE OF PUBLIC HEALTH, PUBLIC HEALTH ASSESSMENT, MADISONVILLE CREOSOTE WORKS, ST. TAMMANY PARISH, LOUISIANA 14 (1996), http://ldh.la.gov/assets/oph/Center-EH/envepi/PHA/Documents/madisonvillecreosotePHA_1996.pdf (recognizing contamination of surface water through contact between floodwater and creosote pits).
[213] *See* John Manuel, In Katrina's Wake, 114 ENVT'L HEALTH PERSP. A32-39 (2006), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1332683/; Michael Biesecker and Jason Dearen, *AP Exclusive: Toxic waste sites flooded in Houston area*, PBS.ORG (Sept. 3, 2017 10:26AM EST), https://www.pbs.org/newshour/nation/ap-exclusive-toxic-waste-sites-flooded-houston-area.
[214] *Burlington Industries Cheraw, SC*, U.S. ENVT'L PROT. AGENCY, https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.Cleanup&id=0404896#bkground (last visited Dec. 5, 2019).
[215] *Hurricane Florence Response*, U.S. ENVT'L PROT. AGENCY, https://response.epa.gov/site/site_profile.aspx?site_id=13923 (last visited Dec. 5, 2019).
[216] Sammy Fretwell, *EPA descends on Cheraw, begins toxic clean up*, THE STATE (Sept. 28, 2018 08:39AM) https://www.thestate.com/latest-news/article219170240.html.
[217] Frank Bajak & Lise Olsen, *Hurricane Harvey's toxic impact deeper than public told*, ASSOCIATED PRESS. (Mar. 23, 2018), https://apnews.com/e0ceae76d5894734b0041210a902218d/Hurricane-Harvey's-toxic-impact-deeper-than-public-told

observed sheens on water after a nearby industrial site was flooded.[218] There was a disturbing lack of disclosure from the EPA about contamination risks following these and many other industrial releases during Hurricane Harvey.[219]

Furthermore, as sea levels continue to rise, coastal groundwater levels will also rise and contribute to poor drainage and flooding.[220] The effect that increased groundwater levels will have on the contamination at the Kerr-McGee site have not been considered thus far. In order to ensure that human health and the environment are protected, the EPA should ensure that changing groundwater levels and increased flooding from more intense storms do not pose an increased risk of contamination mobilization on the Navassa site.

The Proposed Plan does not address climate change-related impacts to OU1, leaving these and other climate-related risks un-analyzed and ultimately leaving human health and the environment at greater risk. This is contrary to the GAO's sensible recommendations[221] and it is weaker than current best practices around the nation. For example, the State of Washington has developed guidance cleanup remedies to improve resilience to impacts from climate change, which recommends, among other things, making resilience to climate-related risk a threshold criterion in remedy selection.[222] Rather than ignore the evidence of these risks, the EPA should analyze them and incorporate them into remedy selection. Doing so will further show why taking no further action to clean up OU1 is unacceptable.

---

[218] Newkirk, *supra* note 210.
[219] Bajak & Olsen, *supra* note 217.
[220] *See* Kolja Rotzoll & Charles H. Fletcher, *Assessment of groundwater inundation as a consequence of sea level rise*, 3 NATURE CLIMATE CHANGE 477-481 (2012), https://www.nature.com/articles/nclimate1725; *see* also Daniel J. Hoover, et al., *Sea-level rise and coastal groundwater inundation and shoaling at select sites in California, USA*, 11 J. HYDROLOGY: REG'L STUDIES 234-249 (2017), https://www.sciencedirect.com/science/article/pii/S2214581815002050.
[221] *See* GAO CLIMATE & SUPERFUND REPORT, *supra* note 207 at 48-49.
[222] WASHINGTON STATE DEPARTMENT OF ECOLOGY, ADAPTATION STRATEGIES FOR RESILIENT CLEANUP REMEDIES: A GUIDE FOR CLEANUP PROJECT MANAGERS TO INCREASE THE RESILIENCE OF TOXIC CLEANUP SITES TO THE IMPACTS FROM CLIMATE CHANGE 40 (2017), https://fortress.wa.gov/ecy/publications/documents/1709052.pdf.

IX. CONCLUSION.

We urge the EPA to make a decision that recognizes the history of environmental injustice, the burden borne by the Town of Navassa in hosting this and other contaminated sites, as well as federal, policy, and prior decision guidance. The EPA should reverse its recommendation for a No Action alternative, and support the most robust clean-up possible for OU1.

Sincerely,

Chandra T. Taylor
Senior Attorney

Brooks Pearson
Staff Attorney

Nick Jimenez
Staff Attorney

Sam Hicks
Associate

cc (via e-mail):

Eulis Willis, Mayor, Town of Navassa, mayor@townofnavassa.org

Michael S. Regan, Secretary, NCDEQ, Michael.regan@ncdenr.gov

Sheila Holman, Asst. Secretary, NCDEQ, Sheila.holman@ncdenr.gov

Jim Bateson, Chief, Superfund Section, NCDEQ, james.bateson@ncdenr.gov

Dave Mattison, Environmental Engineer, NCDEQ, david.mattison@ncdenr.gov

Richard Elliott, Director of Construction Services & Sr. Prjt Mgr., MST, re@g-etg.com

Chris Graham, President, NCEERC, kring2g@gmail.com

DRAFT
Focused Feasibility Study Report
Operable Unit 1

Kerr-McGee Chemical Corp - Navassa Superfund Site
Navassa, North Carolina

EPA ID #NCD980557805

Prepared for:

Greenfield Environmental Multistate Trust, LLC
Trustee of the Multistate Environmental Response Trust

Prepared By:

EARTHCON®
Environmental Challenges
BUSINESS SOLUTIONS ®

February 2019

Table of Contents

EXECUTIVE SUMMARY 1
1.0 INTRODUCTION 8
1.1 PURPOSE AND ORGANIZATION 8
1.2 BACKGROUND INFORMATION 9
1.3 SITE HISTORY 10
1.4 SITE INVESTIGATIONS 11
1.5 SITE REGULATORY HISTORY 11
1.6 POST DECOMMISSIONING ACTIVITIES 13
2.0 NATURE AND EXTENT OF CONTAMINATION 14
2.1 OU1 CHARACTERISTICS 14
2.1.1 Hydrogeology 14
2.1.2 Current and Reasonably Anticipated Future Land Use 14
2.1.3 Potential Sources of Contamination 15
2.1.4 Distribution of Contamination 15
2.1.5 Contaminant Fate and Transport 16
2.2 BASELINE RISK ASSESSMENT SUMMARY 16
2.2.1 Baseline Human Health Risk Assessment 16
2.2.2 Baseline Ecological Risk Assessment 18
3.0 IDENTIFICATION AND SCREENING OF TECHNOLOGIES 19
3.1 REMEDIAL ACTION OBJECTIVES 19
3.1.1 Chemicals and Media of Concern 19
3.1.2 Applicable or Relevant Appropriate Requirements (ARARs) 19
3.1.3 Identification of the ARARS 19
3.1.4 Preliminary Remediation Goals 19
3.1.5 Estimated Volume of Contaminated Media 20
3.2 GENERAL RESPONSE ACTIONS 20
3.2.1 No Action 21
3.2.2 Institutional Controls 21
3.2.3 Monitoring 21
3.2.4 Containment/Isolation 21
3.2.5 Removal 22
3.2.6 Treatment 22
3.2.7 Disposal 22

3.3 IDENTIFICATION AND SCREENING OF REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS 22
3.3.1 Criteria for Preliminary Screening of Remedial Technologies and Process Options 23
3.3.2 Identification, Screening, and Evaluation of Technologies....23
3.4 REMEDIAL APPROACH....26
4.0 DEVELOPMENT AND SCREENING OF REMEDIAL ALTERNATIVES 27
4.1 DESCRIPTION OF REMEDIAL ALTERNATIVES....27
4.1.1 Alternative 1 – No Action....27
4.1.2 Alternative 2 – Institutional Controls....27
4.1.3 Alternative 3 – Removal and Disposal....27
4.1.4 Alternative 4 – Cover (Contingency for Subsurface Soil Only) 28
4.2 EVALUATION CRITERIA....28
4.3 EVALUATION OF REMEDIAL ALTERNATIVES - SOIL....29
4.3.1 Alternative 1 – No Action....29
4.3.2 Alternative 2 – Institutional Controls....30
4.3.3 Alternative 3 – Removal and Disposal....30
4.3.4 ALTERNATIVE 4 - COVER (CONTINGENCY FOR SUBSURFACE SOIL ONLY) 31
5.0 COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES 33
5.1 THRESHOLD CRITERIA....33
5.2 BALANCING CRITERIA....33
5.2.1 Long-Term Effectiveness and Permanence 33
5.2.2 Short-Term Effectiveness....34
5.2.3 Reduction of Toxicity, Mobility, and Volume 34
5.2.4 Implementability....34
5.2.5 Costs 34
5.3 MODIFYING CRITERIA....35
6.0 REFERENCES 36

Tables

Table 2-1 Summary of COPCs in Surface Soil Samples
Table 2-2 Summary of COPCs in Subsurface Soil Samples
Table 3-1 Chemical-Specific ARARs
Table 3-2 Action-Specific ARARs
Table 3-3 Location-Specific ARARs
Table 3-4 Surface Soil PRGs – Industrial Receptors
Table 3-5 Surface Soil PRGs – Teenage Trespasser

Table 3-6 Subsurface Soil PRGs – Construction Worker
Table 3-7 Surface Soil PRGs - Resident
Table 5-1 Detailed Evaluation of Remedial Alternatives—Threshold Criteria
Table 5-2 Detailed Evaluation of Remedial Alternatives—Balancing Criteria

Figures

Figure 1-1 Site Location
Figure 1-2 Site Features
Figure 1-3 Operable Unit 1 Boundary
Figure 2-1 Human Health Conceptual Site Exposure Model
Figure 2-2 Distribution of Creosote-Related SVOCs in Surface Soil
Figure 2-3 Distribution of COPCs above Industrial RSLs in Surface Soil
Figure 2-4 Distribution of Creosote-Related SVOCs in Subsurface Soil
Figure 3-1 Identification and Screening of Remediation Technologies and Process Options
Figure 5-1 Summary of the Detailed Analysis of Remedial Alternatives

Appendices

Appendix A Conceptual Redevelopment Plans
Appendix B Memorandum: Northern Area Trench Evaluation
Appendix C Preliminary Remediation Goal Calculations
Appendix D Remediation Waste Designation Approach
Appendix E Detailed Cost Estimate for Remedial Alternatives

List of Acronyms

ARAR	Applicable or Relevant and Appropriate Requirements
BERA	Baseline Ecological Risk Assessment
Bgs	Below ground surface
Catlin	Catlin Engineers and Scientists
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
COC	Chemical of Concern
COPC	Chemical of Potential Concern
CSM	Conceptual Site Model
EarthCon	EarthCon Consultants of North Carolina, P.C.
EPC	Exposure Point Concentration
ESI	Expanded Site Inspection
FFS	Focused Feasibility Study
GRA	General Response Action
HHRA	Human Health Risk Assessment
HRS	Hazard Ranking System
KMCC	Kerr-McGee Chemical Corp.
Multistate Trust	Multistate Environmental Response Trust
NCDENR	North Carolina Department of Environment and Natural Resources
NCDEHNR	North Carolina Department of Environment, Health, and Natural Resources
NC DEQ	North Carolina Department of Environmental Quality
NCDHS	North Carolina Division of Health Services
NCDOT	North Carolina Department of Transportation
NCP	National Contingency Plan
NPL	National Priorities List
NPV	Net Present Value
O&M	Operations and Maintenance
OU1	Operable Unit 1
PA	Preliminary Assessment
PAH	Polycyclic Aromatic Hydrocarbon
PRG	Preliminary Remediation Goal
PSA	Preliminary Site Assessment
RAO	Remedial Action Objective
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RME	Reasonable Maximum Exposure
ROD	Record of Decision
RSL	USEPA Regional Screening Level for Chemical Contaminants at Superfund Sites
RTPO	Remedial Technologies and Process Options
SARA	Superfund Amendments and Reauthorization Act
SI	Site Inspection
SIP	Site Inspection Prioritization
SSI	Screening Site Investigation
SVOC	Semi-Volatile Organic Compound
TCLP	Toxicity Characteristic Leaching Potential
Tronox	Tronox, LLC
USEPA	United States Environmental Protection Agency

Executive Summary

Greenfield Environmental Multistate Trust LLC (Multistate Trust), Trustee of the Multistate Environmental Response Trust has prepared this Focused Feasibility Study (FFS) report for Operable Unit 1 (OU1) of the Kerr-McGee Chemical Corp - Navassa Superfund Site (the Site) [United States Environmental Protection Agency (USEPA) ID# NCD980557805], a former creosote-based wood treating facility located in Navassa, North Carolina (Figure 1-1). Wood treating operations occurred at the facility from 1936 until 1974. The former Kerr-McGee Chemical Corporation (KMCC) property has not been redeveloped or used for industrial activity since KMCC decommissioned the plant in 1980.

The Site is divided into four areas for the purposes of investigation and remediation including the Northern Area, a 117-acre area consisting of surface soil and terrestrial sediment (referred to collectively as "surface soil") north of the fence line as shown on Figure 1-2. The Northern Area consists of the 32-acre Treated and Untreated Wood Storage Areas located north of the fence line and the 85-acre Eastern Upland Area which was not used in the wood treating process. The scope of this FFS is the 32-acre Treated and Untreated Wood Storage Area of the Northern Area which is designated as OU1 (Figure 1-3).

Site characterization during the RI has demonstrated the presence of constituents associated with creosote wood treatment in OU1 soils. The human health risk assessment (HHRA; EarthCon 2019) indicates there is not an unacceptable risk to current or future human receptors based on the anticipated future land use of OU1 which is commercial/industrial/recreational; however, there is uncertainty in this finding due to the limited number of samples collected to date. The Multistate Trust, in cooperation with USEPA and NC DEQ, will conduct additional sampling to address this uncertainty. This FFS identifies and evaluates potential remedial alternatives for OU1 should the additional data collection indicate creosote-related constituents are present at levels that pose an unacceptable human health risk under potential exposure pathways consistent with the anticipated future land use. The FFS will form the basis for USEPA's selection of a remedy for OU1 should remedial action, beyond implementation of Institutional Controls, be warranted.

General response actions (GRAs) and remedial technologies and process options (RTPOs) evaluated in the FFS are summarized in the table below. The RTPOs identified for OU1 soils were evaluated to identify those that are most appropriate for the site-specific conditions. Each RTPO was screened based on effectiveness, implementability, and relative cost. RTPOs shown in bold in the table below were retained for consideration in remedial alternatives development.

General Response Action	Description	Remedial Technology and Process Options
Institutional Controls	Administrative methods that limit land use and access to limit or prevent receptor exposure to contaminated soils.	**Deed or Site Use Restrictions** Physical Barriers
Containment/Isolation	Physical barriers or structures to contain the contaminated media, to limit or prevent receptor exposure to contaminants.	**Cover**

General Response Action	Description	Remedial Technology and Process Options
Removal	Removal of contaminated soil from its original location through excavation.	**Soil Excavation**
Treatment	Use of *in situ* or *ex situ* technologies to chemically degrade and/or physically stabilize contaminants.	*In Situ* Stabilization *Ex Situ* Stabilization *In Situ* Chemical Amendment Land Farming Soil Washing
Disposal	Placement of contaminated media in a new, controlled location that eliminates potential exposure pathways between receptors and contaminated soils.	**Offsite Landfill Disposal** **Onsite Consolidation**

Four remedial alternatives were identified for OU-1 soils:

- Alternative 1: No Action - No action is a baseline GRA scenario for the evaluation of alternative GRAs. No remedial action or monitoring would be performed under the no action GRA—providing a baseline assessment of the impact of the "as is" condition on potential receptors.
- Alternative 2: Institutional Controls - This alternative includes the government controls (zoning), property controls (deed restrictions), enforcement permits (decrees, administrative orders, and contracts), and information tools (public notices and signage).
- Alternative 3: Removal and Disposal - This alternative includes the following main elements: excavation of contaminated OU1 soils, disposal of soils at either an off-site disposal facility or temporarily stockpiled at an on-site location outside of the OU1 boundary, and placement of clean backfill.
- Alternative 4: Cover (Contingency for Subsurface Soil Only) - This alternative includes the following main elements: placement of a cover over contaminated OU1 subsurface soils and implementation of institutional controls to prevent exposure to contaminants in soils beneath the cover.

Each alternative was evaluated according to the remedy evaluation criteria specified by USEPA and the National Contingency Plan (NCP). Each alternative must meet two threshold criteria—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs)—to be eligible for selection as USEPA's preferred alternative. Five balancing criteria are then applied as a framework to assess tradeoffs among the long-term and short-term effectiveness; reduction in contaminant toxicity, mobility, or volume through treatment; implementability; and cost of each alternative. The final two criteria address state and community acceptance. These are considered modifying criteria and are assessed by USEPA, subsequent to the feasibility study, based on consideration of state and public comment on USEPA's proposed plan for remedial action.

The no action alternative does not meet the threshold criteria and is thus not considered a viable alternative for OU1 soils. At a minimum, ICs will be required to restrict land use to commercial/industrial. ICs will also be required to verify that during redevelopment activities, soils are managed in such a way that they do not pose an unacceptable risk to human health or the environment.

Additional soil data collection has been described in this FFS to refine the OU1 boundaries and address potential uncertainties associated with the current data set. If the results of the additional data collection activities indicate the soils in OU1 pose an unacceptable risk to human receptors under the commercial/industrial/recreational land use scenario, it is expected that the following remedial alternatives would be considered to achieve the RAO.

- If surface soil poses an unacceptable risk, soil excavation/disposal and ICs would be viable as the remedial option
- If subsurface soil poses an unacceptable risk, two remedial options would be evaluated:
    - Soil excavation/disposal and ICs, or
    - Soil excavation/disposal, subsurface cover, and ICs

USEPA, in consultation with NC DEQ, will select the OU1 remedial alternative and present it in the proposed plan. USEPA will consider input from the public during public meetings, and written comments on USEPA's proposed plan. The final OU1 remedial alternative will be documented in the Record of Decision (ROD).

1.0 INTRODUCTION

Greenfield Environmental Multistate Trust LLC (Multistate Trust), Trustee of the Multistate Environmental Response Trust has prepared this Focused Feasibility Study (FFS) report for Operable Unit 1 (OU1) of the Kerr-McGee Chemical Corp - Navassa Superfund Site (the Site) [United States Environmental Protection Agency (USEPA) ID# NCD980557805], a former creosote-based wood treating facility located in Navassa, North Carolina (Figure 1-1). Wood treating operations occurred at the facility from 1936 until 1974. The former Kerr-McGee Chemical Corporation (KMCC) property has not been redeveloped or used for industrial activity since KMCC decommissioned the plant in 1980.

The KMCC property is divided into four areas for the purposes of investigation and remediation as described below.

1. The Northern Area – This 117-acre area consists of surface soil and terrestrial sediment north of the fence line as shown on Figure 1-2. There are no groundwater impacts in this area. The Northern Area is divided into two distinct areas:
    - the 32-acre Treated, and Untreated Wood Storage Areas located north of the fence line, and
    - the 85-acre Eastern Upland Area which was not used in the wood treating process
2. The Pond and Process Area – This 36-acre area incorporates surface soil and terrestrial sediment, and subsurface soil in the Process Area and the Pond Area and the portion of the Untreated Wood Storage Area located south of the fence line as shown on Figure 1-2.
3. The Marsh Area – The Marsh Area consists of sediment in the Southern Marsh as shown on Figure 1-2.
4. Groundwater – This area includes the footprint of impacted groundwater in the southern portion of the property (Pond and Process Area) and west of Navassa Road.

The scope of this FFS is the 32-acre Treated and Untreated Wood Storage Area of the Northern Area which is designated as OU1 (Figure 1-3). The lateral extent of OU1 has been estimated based on data collected and observations made during the Remedial Investigation (RI; EarthCon, 2019a). The eastern boundary of OU1 will be refined during the Remedial Design (RD).

1.1 PURPOSE AND ORGANIZATION

Site characterization during the RI has demonstrated the presence of constituents associated with creosote wood treatment in OU1 soils. The human health risk assessment (HHRA; EarthCon, 2019b) indicates that there is not an unacceptable risk to current or future human receptors based on the anticipated future land use of OU1 which is commercial/industrial/recreational. However, there is uncertainty in this finding due to the limited number of soil samples collected to date. The Multistate Trust, in cooperation with USEPA and the North Carolina Department of Environmental Quality (NC DEQ) will conduct additional soil sampling to address this uncertainty. Additionally, the HHRA indicates unacceptable risk to current and future human receptors under the residential use scenario unless measures are taken to restrict future residential use of OU1.

This FFS identifies and evaluates potential remedial alternatives for OU1. The first step of the FFS is to identify the remedial action objective (RAO) for OU1. Once the RAO is identified, remedial alternatives to mitigate risks posed to human health and the environment and achieve the RAO are developed and evaluated. The objective of the FFS is to document the remedy selection process conducted pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR 300). The FFS follows USEPA guidance provided in the Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA (Interim Final) (USEPA 1988).

The FFS report is organized as follows:

Section 1: Introduction - Purpose and Organization of the FFS Report, Site Background, and Site History
Section 2: Nature and Extent of Contamination—Site Characteristics (important site features; sources, distribution, and fate and transport of contaminants) and Baseline Risk Assessment
Section 3: Identification and Screening of Technologies—Remedial Action Objectives, General Response Actions, and Identification and Screening of Remediation Technologies and Process Options
Section 4: Development and Screening of Remedial Alternatives—Evaluation Criteria and Description and Evaluation of Remedial Alternatives
Section 5: Comparative Analysis of Remedial Alternatives
Section 6: References
Appendix A: Conceptual Redevelopment Plans
Appendix B Memorandum – Northern Area Trench Evaluation
Appendix C: Preliminary Remediation Goal Calculations
Appendix D: Remediation Waste Designation Approach
Appendix E: Detailed Cost Estimate for Remedial Alternatives

1.2 BACKGROUND INFORMATION

The Site is a former wood treating facility located within the limits of the Town of Navassa, in Brunswick County, North Carolina (Figure 1-1). The property is bounded to the north by Quality Drive and the former Rampage Boat Company, to the east by the Brunswick River, to the south by Sturgeon Creek, and to the west by Navassa Road.

The property consists of approximately 246 acres, 154 acres of upland areas and 92 acres of marsh. The upland areas are owned by the Multistate Trust and include two 1-acre former residential parcels located within the east central portion of the property. The marsh is owned by the State of North Carolina. As shown on Figure 1-2, the eastern two-thirds of the property (Eastern Upland Area) is undeveloped and wooded and bounded to the east by a marsh.

Figure 1-3 shows the property boundary on the 1969 historical aerial photograph. Historically, the western third of the property, consisting of approximately 62 acres, was used for the wood treating operations. The north western portion of the Site was used primarily for storage of treated and untreated wood (Treated and Untreated Wood Storage Areas). The southern portion of the Site (Process Area and Pond Area) was used in the wood treating process. Areas of the tidal marsh south of the former wood treating facility that have been impacted by wood treating process releases are also included in the Site. The Eastern Upland Area, including the former residential

parcels, was not used in the wood treating process. Similarly, the Eastern Marsh was not used in the wood treating process and is not impacted by Site-related constituents.

The scope of this FFS is the 32-acres of the Treated and Untreated Wood Storage Areas located within the 117-acre Northern Area and north of the east-west trending fence, which consists of surface soils and terrestrial sediment that do not represent a primary source of contamination to groundwater. This area is designated as OU1 (Figure 1-3). OU1 is bounded by Quality Drive to the north, the Eastern Uplands Area to the east, Navassa Road to the west and the Process and Pond Areas to the south.

1.3 SITE HISTORY

The following presents a summary of the operational history of the Site based on information presented in the RI Report (EarthCon, 2019a).

From 1936 to 1974, a wood treating plant was operated on the southwestern and western area of the property. The treated wood was used for railroad ties, utility poles, and pilings. The plant was originally constructed by Gulf States Creosoting Company in 1936. American Creosoting purchased the facility in 1958 and sold it to KMCC in 1965. KMCC reportedly used only creosote as a preservative in their wood treating process. KMCC discontinued site operations in 1974. The plant was decommissioned and dismantled in 1980. Plant equipment, treatment cylinders, buildings, and tanks were reportedly demolished and/or sold as scrap during the dismantling/closure process. There are no known work plans, reports, photos, surveys, analytical results or construction reports to document the decommissioning activities. The documentation is limited to a letter dated August 14, 1984 from KMCC to the North Carolina Division of Health Services (KMCC, 1984).

During plant operations, untreated wood was cut, dried, and stored in the Untreated Wood Storage Area shown on Figure 1-3. Creosote storage and application occurred in the Process Area. Wood treatment cylinders, a boiler house, and product storage tanks were located in this area. The Process Area was approximately 6.4 acres in size (Figure 1-3).

The wood treating process involved placing pre-cut timber in a treatment cylinder. The cylinder was then filled with a creosote and oil solution and pressurized, forcing the creosote into pore spaces within the cut timber. Treatment occurred in either of two 140-foot long by 8-foot diameter cylinders. The creosote was stored in steel, aboveground tanks situated within a diked containment area, located in the south-central end of the Process Area, just north of the Fire Protection Pond. The pressure cylinders and boiler house were in the central portion of the Process Area. The boiler house and treatment cylinder foundations remain on the Site.

Treated wood was removed from the cylinders and transferred via rail car from the Process Area to the Treated Wood Storage Area where it was unloaded and staged (Figure 1-3).

The wood treating process generated wastewater which was collected and discharged into two unlined earthen surface impoundments referred to as “process water treatment ponds” in the 1984 KMCC letter and now referred to as the Wastewater Ponds. The Wastewater Ponds, which were originally constructed by Gulf States Creosoting, each measured approximately 125 feet by 60 feet by approximately 6 feet deep. Based on historical aerial photographs, construction of the Wastewater Ponds began prior to 1938. Creosote was separated and reclaimed for reuse in the Wastewater Ponds. The effluent from the Wastewater Ponds was reportedly recycled to a condenser as make-up cooling water. After 1966, excess wastewater was discharged to an evaporation pond (referred to as the “Operations Evaporation Pond”) installed by KMCC. A second evaporation pond (referred to as the “Decommissioning Evaporation Pond”) was installed after 1969. The former location of the Wastewater Ponds is shown on Figure 1-3.

In 1980, the wood treating plant was decommissioned and dismantled. As part of the decommissioning process, wastewater in the Wastewater Ponds was pumped to the evaporation pond(s). Creosote in the Wastewater Ponds was reported by KMCC to be reclaimed. The material remaining in the Wastewater Ponds and the solid materials that had settled in the creosote storage tanks were reportedly mixed with clean soil, consolidated and compacted in the bottom of the Wastewater Ponds. The ponds were then backfilled with clean soil and covered with a vegetative cap (KMCC, 1984).

1.4 SITE INVESTIGATIONS

Beginning in the 1980s, multiple parties have performed environmental investigations at the Site and surrounding areas, including: KMCC, the North Carolina Department of Environment, Health and Natural Resources (NCDEHNR) [subsequently the North Carolina Department of Environment and Natural Resources (NCDENR) and now known as NC DEQ], the North Carolina Department of Transportation (NCDOT), the USEPA and the Multistate Trust. Investigations undertaken include the following:

- NCDEHNR Site Inspection
- NCDEHNR Site Inspection Prioritization
- NCDEHNR Memorandum of Off-Site Visit
- NCDOT Preliminary Site Assessment
- NCDOT Soil Assessment
- NCDENR Site Re-Assessment
- Expanded Site Inspection
- Pre-Remedial Investigation Soil Sampling
- Remedial Investigation

A summary of the results of the site investigations is provided in the RI report (EarthCon, 2019a).

1.5 SITE REGULATORY HISTORY

The Site was originally managed under the State cleanup program prior to referral to USEPA in 2003. In March 2006, KMCC created Tronox, LLC (Tronox) as a spin-off corporation and Tronox assumed responsibility for the Site. Beginning in July 2006, the Site was managed as a Superfund Alternative Site. Tronox filed for bankruptcy in January 2009 and was unable to continue investigation; therefore, USEPA issued a partial work take over in March 2010. The Multistate Trust was created in February 2011 as part of the Tronox bankruptcy settlement and assumed responsibility for owning and managing the Site, including the investigation and remediation. Pertinent letters and reports documenting the Site regulatory history are described below.

- KMCC submitted a Notification of Hazardous Waste Site form to USEPA Region 4 on June 8, 1981.

- On July 11, 1984, the North Carolina Division of Health Services (NCDHS) sent a letter to KMCC requesting additional information.

- On August 14, 1984, KMCC sent a letter to the Solid and Hazardous Waste Management Branch, Environmental Health Section of the North Carolina Department of Human Resources providing background information on the closed KMCC facility in Navassa.

- On October 8, 1984, the NCDHS submitted a Preliminary Assessment (PA) to the USEPA recommending a site inspection (SI) with a medium priority.

- On May 3, 1988, the NCDHS submitted the PA Update to the USEPA recommending a medium priority for a screening site investigation (SSI).

- In 1988, the Superfund Section of the NCDEHNR performed an SI at the Site (NCDEHNR, 1989), which indicated the presence of creosote-related constituents in soil beneath the former Wastewater Ponds.

- Based on the results of the SI, NCDEHNR performed a Site Inspection Prioritization (SIP) investigation in May 1995, which also indicated creosote impacts to the Site. Based on the results of the SIP, the Site was recommended for a low priority Expanded Site Inspection (ESI).

- In April 1998, the NCDEHNR received notification of creosote discovered in a roadside excavation on the east side of Navassa Road. A contractor for Brunswick County was excavating to install wastewater lines and observed “dark material” and the odor of creosote at the water table.

- A NCDEHNR Memorandum of Off-site Visit dated April 17, 1998 indicated that a test pit containing visible creosote contamination was located on the east side of Navassa Road approximately 625 feet north of the edge of the wetlands on the north side of Sturgeon Creek and 990 feet north of the bridge span. An oily sheen was visible on the groundwater surface and a moderate tar/creosote odor was reported.

- In December 2001, the NCDOT retained Catlin Engineers and Scientists (Catlin) to perform a Preliminary Site Assessment (PSA) for a proposed right of way on a portion of the former wood treating facility and a parcel of property located on the west side of Navassa Road. This assessment indicated the presence of creosote-related constituents in soil along Navassa Road.

- In February 2003, the NCDOT retained Catlin to perform a targeted soil assessment associated with bridge replacement along the west side of Navassa Road to determine if soils in this area contained constituents associated with the former wood treating facility.

- Based on the results of the SI, SIP, and PSA, the NCDENR submitted a Site Re-Assessment letter to the USEPA in March 2003 (NCDENR, 2003). The Site Re-Assessment letter briefly highlighted the results of the previous investigations described above and recommended that the Site be considered for further evaluation by the USEPA.

- On June 14, 2004, USEPA and KMCC entered into an Administrative Order on Consent for the performance of the ESI. The purpose of the ESI was to obtain data for USEPA to evaluate the Site using the CERCLA Hazard Ranking System (HRS). The ESI results were to be used to determine the future course of action for the facility as part of its HRS evaluation under CERCLA.

- The ESI, which was implemented in November 2004, indicated the presence of creosote-related constituents in each of the sampled media (soil, sediment, surface water, and groundwater), with the highest concentrations detected in the areas where wood treating operations were conducted.

- In March 2006, KMCC created Tronox as a spin-off corporation and Tronox assumed responsibility for assessment and remediation activities at the former creosote wood treating facility in Navassa.

- Based on the results presented in the ESI, in July 2006, USEPA and Tronox entered into an Administrative Order on Consent to perform a Remedial Investigation/Feasibility Study (RI/FS) pursuant to CERCLA. At that time, the Site had not been added to the National Priorities List (NPL). Instead CERCLA activities were being conducted under the Superfund Alternative Approach.

- In January 2009, Tronox filed for Chapter 11 Bankruptcy Protection in Federal Court. As a result, the RI/FS process was temporarily halted.

- In September 2009, the NCDENR, in conjunction with the USEPA, completed the HRS Documentation Record for the Site using the ESI sampling results. The HRS scored 50 which resulted in consideration of the Site for listing on the NPL.

- In March 2010, the USEPA issued a partial work takeover notice. This allowed the USEPA to conduct portions of the RI/FS including a marsh sediment sampling program, residential sampling program, and collection of tissue samples.

- In April 2010, the KMCC Site in Navassa was added to the NPL.

- On February 14, 2011, the Multistate Trust was established as part of the Tronox bankruptcy settlement to own and assume responsibility for hundreds of Tronox sites, including the Site in Navassa. In accordance with the bankruptcy Settlement Agreement, the Multistate Trust assumed ownership and responsibility for Site remediation under CERCLA. The Greenfield Environmental Multistate Trust, LLC, as Trustee of the Multistate Environmental Response Trust, is performing Environmental Actions at the KMCC Site in Navassa as fiduciary whose sole beneficiaries are the USEPA and the State of North Carolina.

1.6 POST DECOMMISSIONING ACTIVITIES

As part of the plant decommissioning and dismantling conducted in 1980, KMCC removed stored wood, buildings and railroad tracks from the Treated and Untreated Wood Storage Areas (KMCC, 1984).

After the Multistate Trust was established in 2011, the Multistate Trust conducted additional post decommissioning actions in the Northern Area of the KMCC property. These actions consisted of asbestos abatement of two houses previously located on the former residential property in the Eastern Upland Area and abatement of a methamphetamine laboratory also previously located on the former residential property. The methamphetamine laboratory abatement was conducted in November 2017. The asbestos abatement was conducted in December of 2017 prior to demolition of the residences. In addition, a fence was installed around the southern portion of the property, primarily the Pond and Process Areas, in 2015 to restrict access.

2.0 NATURE AND EXTENT OF CONTAMINATION

This section presents a summary of the conceptual site model (CSM) for OU1, including key characteristics and the nature and extent of contamination based on the data and analyses presented in the RI Report (EarthCon, 2019a). In addition, this section presents preliminary findings from the HHRA (EarthCon, 2019b).

A summary of the CSM describing the sources, transport mechanisms, and exposure pathways for human receptors in OU1 is presented in Figure 2-1.

2.1 OU1 CHARACTERISTICS

OU1 is approximately 32 acres of vacant, partially wooded land. There are no structures in OU1 although building foundations and surface debris (brick, wood, roofing metal and tires) are present in some areas. The property has limited areas of standing water. Surface water found in OU1 is primarily localized and intermittent storm water typically associated with heavy or prolonged rainfall events. Remnants of a drainage swale traverses the northern portion of OU1 trending from east to west as shown on Figure 1-3. This drainage swale does not consistently contain standing water.

2.1.1 Hydrogeology

The former KMCC property is in the northeast portion of Brunswick County in the Coastal Plain Physiographic Province. The sedimentary soils in this province consist of thickly bedded sand, silts and clays, shells, sandstone, and limestone that are more than 1,000 feet thick and overlie igneous and metamorphic basement bedrock. Locally, the property is underlain by surficial soils that consist of a pale yellow to gray, medium to fine sand with intermittent zones of silty to clayey sands with some natural organic materials. The uppermost surficial soils are underlain by pale yellow to light brown to gray predominantly finer grain material referred to locally as the Gumbo clay. The surficial soils, the Gumbo clay and the soils below the clay are considered to represent the Surficial Aquifer. The Peedee Formation underlies the Surficial Aquifer. The contact with the Peedee Formation is characterized by a distinct color change from yellowish brown to dark gray. The Peedee Formation consists of silty medium sands with traces of mica and fine shell fragments with thin layers of calcareous cemented sands which comprise the Peedee Aquifer.

The Surficial Aquifer and upper part of the Peedee Aquifer are an important source of groundwater supply for domestic and commercial use in Brunswick County (USGS, 2003). The direction of groundwater flow in the Surficial Aquifer and the Peedee Aquifer is to the south-southeast towards the southern marsh and Sturgeon Creek.

2.1.2 Current and Reasonably Anticipated Future Land Use

Land use in the Navassa area of Brunswick County is both rural residential and industrial. The residential areas are west of the Site and Navassa Road. Most of the land area to the north of the Town and the property remains undeveloped and consists of industrial sites and undeveloped coastal forest or low-lying marsh. The Northern Area is owned by the Multistate Trust. The majority of the Northern Area, including OU1, is zoned for heavy industrial use except for two former residential parcels located in the Eastern Upland Area which are zoned R-10 (Moderate Density Single Family Residential). Upon completion of any required remedial action in OU1, the Multistate Trust intends to make the Northern Area available for community-supported

redevelopment. Community outreach activities, market studies, and evaluation of site conditions were conducted and were presented in four conceptual redevelopment plans (Appendix A).

The conceptual redevelopment plans indicate that the preferred future land use for OU1 is commercial/industrial. Therefore, the evaluation of remedial alternatives for OU1 in this FFS is based on achieving conditions that are protective under a commercial/industrial land use scenario. The existing data and HHRA suggest that a portion of OU1 may be suitable for unrestricted use. Although achieving unrestricted land use is not the objective of the OU1 remedial action, additional soil sampling proposed in the RD may identify areas for potential unrestricted land use.

2.1.3 Potential Sources of Contamination

The primary contaminants in OU1 are the creosote-related constituents associated with the wood treating process used at the Site. Contamination in OU1 likely originated from the storage of treated wood in the Treated Wood Storage Area, from buried creosote timbers, and/or transport from other areas by movement of personnel and vehicles between the areas. Because the facility decommissioning removed most of the surface features (buildings, rail lines, railroad timbers) and possibly soil in some areas, it is difficult to confirm the original source of contamination. Decommissioning activities, such as removal of stored wood, buildings and railroad tracks, may also have resulted in movement of contaminated soils within the Treated and Untreated Wood Storage Areas.

2.1.4 Distribution of Contamination

The primary constituents of creosote are semi-volatile organic compounds (SVOCs) which include polycyclic aromatic hydrocarbons (PAHs), phenols, and 3 constituents closely associated with the PAHs (1,1-biphenyl, carbazole and dibenzofuran).

Creosote-related SVOCs were detected above residential regional screening levels (RSLs) in 36 of 55 surface soil and terrestrial sediment samples collected throughout OU1 as shown on Figure 2-2 and above industrial RSLs in seven samples as shown on Figure 2-3. Surface soil is considered to be soil from the ground surface to a depth of 1 foot. Terrestrial sediment samples are surface soil samples collected from drainage ditches or swales that contain water only intermittently. These samples are identified with an “SD”. For the purposes of this FFS, the surface soil and terrestrial sediment will be referred to collectively as “surface soil” going forward.

Creosote-related SVOCs were detected in subsurface soils [defined as soils from one-foot below ground surface (bgs) to 10 feet bgs or to groundwater, whichever is shallower] in OU1. Concentrations of SVOCs in subsurface soil were generally lower than the concentrations in the surface soil indicating surface releases of creosote consistent with the use of this area. The occurrence of SVOCs above residential RSLs in the subsurface soil was limited to three out of 50 samples collected from OU1 (Figure 2-4). The occurrence of SVOCs above industrial RSLs in the subsurface soil was limited to sample location RISB05.

Uncertainty as to the extent of SVOCs in the subsurface existed due to the limited number of subsurface soil samples collected from OU1. To address this uncertainty, additional assessment of the subsurface soils in OU1 was conducted in May 2018. The results of this assessment, which are summarized in the Northern Area Trench Evaluation memorandum provided as Appendix B, indicated that cumulative risks and hazards do not exceed industrial levels.

2.1.5 Contaminant Fate and Transport

Creosote-related constituents may be transported in the surface and subsurface through a variety of mechanisms. The potential transport pathways are described below:

- Erosion and transport on the surface by wind and surface water flow.
- Dissolution of contaminants from contaminated soils in the unsaturated zone and transport to the saturated zone by surface water infiltration and precipitation.
- Volatilization of contaminants from soils and groundwater to the atmosphere or air space of an overlying (future) structure (i.e., vapor intrusion).

Constituents in the unsaturated zone can be mobilized to groundwater as a result of dissolution into and downward transport via infiltrating surface water (USEPA, 2002; 2018b). Concentrations of several SVOCs in subsurface soil in OU1 exceed the default risk-based soil screening levels protective of groundwater as described in the HHRA Report. However, because groundwater concentrations in OU1 are not detected, the residual SVOCs in soil in these areas do not appear to be a continuing source to groundwater.

2.2 BASELINE RISK ASSESSMENT SUMMARY

A baseline human health risk assessment (HHRA; EarthCon, 2019b) and baseline ecological risk assessment (BERA; Ramboll, 2019) were completed for the Site based on the data collected during the RI and previous Site investigations. The objective of the HHRA is to characterize the carcinogenic and non-carcinogenic risk to human health from contamination at the Site in support of the Site's risk managers' decision-making process. The BERA focuses on ecological receptors in the Marsh Study Area and does not include upland terrestrial receptors. As such, the BERA does not inform the evaluation and selection of the OU1 remedy.

2.2.1 Baseline Human Health Risk Assessment

To support the HHRA, the Site was divided into areas based on its operational history, and the risk levels for each area were determined separately. The areas evaluated relevant to OU1 included the Treated Wood Storage Area and the Untreated Wood Storage Area. The current and anticipated future land use for OU1 is commercial/industrial/recreational. Consistent with this land use, the HHRA evaluated risks to a future indoor worker, future outdoor worker, and future construction worker; as well as to current and future teenage trespassers. The HHRA also included an evaluation of potential risks to a future resident (child and adult). Although remediation to support residential use is not an objective of the OU1 remedial action, evaluation of residential risks supports identifying areas of OU1 that may be suitable to unrestricted land use.

The following exposure pathways were quantitatively evaluated for OU1:

- Future on-site indoor workers – inhalation of volatiles in indoor air
- Future on-site outdoor workers - incidental ingestion of surface soil, dermal contact with surface soil, and inhalation of particulates and volatiles in outdoor air
- Future on-site construction workers - incidental ingestion of soil, dermal contact with soil, and inhalation of particulates and volatiles in outdoor air
- Current/future teenage trespasser - incidental ingestion of surface soil and dermal contact with surface soil

- Future residents (child and adult) - incidental ingestion of surface soil, dermal contact with surface soil, inhalation of volatile constituents in indoor air (i.e., vapor intrusion pathway), and inhalation of particulates and volatiles in outdoor air

The chemicals of potential concern (COPCs) evaluated in the HHRA for the Treated and Untreated Wood Storage Areas were selected by comparing maximum detected concentrations in soil to risk-based screening levels and, where available, background sample concentrations. Table 2-1 summarizes the COPCs that were detected above industrial and residential RSLs in one or more surface soil samples from OU1. Table 2-2 summarizes the COPCs detected above industrial and residential RSLs in one or more subsurface soil samples from OU1. Groundwater contamination is not present in OU1.

Exposures were quantified by estimating the potential chemical intake (dose) associated with each potential exposure pathway. Exposure point concentrations (EPCs) were calculated for each exposure medium (surface and subsurface soil). EPCs represent the chemical concentration that a receptor could contact over the exposure period. Exposure parameters that defined the frequency, duration, and magnitude of potential contact with an impacted medium were used to estimate dose under a reasonable maximum exposure (RME)[1] scenario. Cancer slope factors and inhalation unit risks were used to quantify the toxicity of carcinogens. Reference doses and reference concentrations were used to quantify noncancer toxicity.

Based on the soil data collected to date, the HHRA concluded that there are no unacceptable risks to a future indoor worker, future outdoor worker, future construction worker, or for a current or future teenage trespasser as a result of direct and indirect exposure to surface soil in OU1. Unacceptable risks were identified for a potential future resident, indicating that unrestricted use is not appropriate for at least a portion of OU1 under the current site conditions.

There is uncertainty associated with the HHRA conclusions due to the limited number of soil samples collected in OU1 and elevated detection limits for thallium in soil. Additional data collection will be completed to:

- Provide additional data to assess if contaminant concentrations in OU1 soils pose an unacceptable risk to potential human receptors under a commercial/industrial/recreational land use scenario and, if an unacceptable risk is identified, delineate the extent of soils requiring remediation.
- Support refinement of the location of the boundary between OU1 and the Eastern Upland Area.
- Analyze a representative number of soil samples using a method that supports lower detection limits to assess if thallium is present at a concentration that may represent an unacceptable risk to human receptors.

To expedite making the Northern Area available for community-supported redevelopment for commercial/industrial/recreational use, this FFS has been prepared to support the selection of a remedial alternative for OU1 soils in the event that the additional data collection indicates that current conditions present an unacceptable risk warranting remedial action. The additional

[1]The RME estimate is a conservative exposure case (i.e., upper bound estimate of the average) that is still within the range of possible exposures.

sampling will be conducted as an initial phase of the RD and will supplement the existing data set in the delineation of the extent of the area and depth of any soils requiring remediation to address unacceptable risks to a future indoor or outdoor worker, construction worker, or trespasser.

2.2.2 Baseline Ecological Risk Assessment

Remedial actions are proposed for OU1 based on the results of the HHRA and proposed future land use scenarios. As such, a baseline ecological risk assessment (BERA) would not inform those actions. However, a BERA was conducted for the Marsh Area which is outside the scope of this FFS. The BERA focus on marsh receptors was initially discussed with USEPA and NC DEQ during a site visit on August 2, 2016 and was discussed again and agreed upon during a teleconference held August 23, 2016 and in an October 6, 2016 meeting.

3.0 IDENTIFICATION AND SCREENING OF TECHNOLOGIES

This section presents the basis for identification, evaluation, and selection of remedial technologies and process options that were considered in the development of the remedial alternatives presented in Section 4.

3.1 REMEDIAL ACTION OBJECTIVES

The remedial action objective (RAO) describes what the proposed site remediation is expected to accomplish. The following RAO has been identified for OU1:

- Prevent unacceptable risk to human receptors from exposure to soil with concentrations of COCs above health-based cleanup goals.

3.1.1 Chemicals and Media of Concern

As described in Section 2.2.1, the HHRA did not identify COCs in OU1 for industrial receptors.

Although the HHRA did not identify COCs for industrial receptors for OU1 soils, there is uncertainty associated with the absence of COCs due to the limited number of soil samples collected and uncertainty in the thallium data due to elevated detection limits. To address these uncertainties, additional soil samples will be collected during the RD for OU1.

3.1.2 Applicable or Relevant Appropriate Requirements (ARARs)

TBD

3.1.3 Identification of the ARARS

TBD

- Chemical-specific—requirements that set protective remediation goals for the COCs. Table 3-1 lists potential generic chemical-specific ARARs for OU1.

- Location-specific—requirements that restrict remedial actions based on the characteristics of the Site or its immediate surroundings. Table 3-2 lists potential sources of action-specific ARARs for OU1, selected based on potential remedial action alternatives. Under CERCLA, remedial actions are exempt from having to obtain permits but must meet the substantive requirements of applicable permits.

- Action-specific—requirements that set controls or restrictions on the design, implementation, and performance levels of activities related to the management of hazardous substances, pollutants, or contaminants. Table 3-3 lists potential sources of action-specific ARARs for OU1.

3.1.4 Preliminary Remediation Goals

Preliminary remediation goals (PRGs) are cleanup goals for concentrations of contaminants in environmental media that, when attained, should achieve RAOs. Although the HHRA did not identify COCs for OU1 soils for industrial receptors, there is uncertainty in these findings due to the limited current data set and additional data collection is planned to address this uncertainty.

In an effort to expedite implementation of remedial action should this sampling show that OU1 soils pose an unacceptable risk to commercial/industrial/recreational receptors (indoor and outdoor workers, construction worker, teenage trespasser), PRGs have been calculated for the COPCs identified in the HHRA, for nine additional PAHs associated with creosote and for thallium. These PRGs will be used as risk-based metrics to support a rapid evaluation of the soil data set. PRGs were calculated based on the commercial/industrial/recreational land use pathways described in Section 2.2 using the USEPA's RSL Calculator for target cancer risk levels of 10^{-4} to 10^{-6} and Hazard Quotients (HQ) of 0.1, 1 and 3 (Appendix C). Although the USEPA has not formally specified the target risk levels for OU1, it is anticipated that the PRGs based on a cancer risk level of 10^{-5} and an HQ of 1 will be used to evaluate the OU1 soil data set. The surface soil PRGs for the industrial use scenario (on-site worker and construction worker) are provided in Table 3-4. The surface soil PRGs for the teenage trespasser are provided in Table 3-5. PRGs were also established for subsurface soil. The subsurface soil PRGs for the industrial use scenario (construction worker) are provided in Table 3-6.

The objective of the OU1 remedial action is to achieve conditions that will be protective for commercial/industrial/recreational land use. However, PRGs were also calculated for surface soil for the residential land use scenario to support identification of areas within OU1 that are suitable for unrestricted use. The surface soil PRGs for the resident are provided in Table 3-7.

3.1.5 Estimated Volume of Contaminated Media

As discussed above, additional data will be collected to determine if OU1 soils pose an unacceptable risk under the anticipated future commercial/industrial/recreational land use and, if so, to establish the area and volume of soil contamination requiring remediation. To evaluate the cost of the various remedial alternatives in this FFS, it was assumed a volume of approximately 5,000 cubic yards of surface soils and 1,000 cubic yards of subsurface soil would require remediation.

3.2 GENERAL RESPONSE ACTIONS

A general response action (GRA) is a media-specific generic action for addressing contamination and achieving RAOs at CERCLA sites. The GRAs provide the framework for identifying remedial technologies or methods for the Site. Based on the RAO for OU1, the media of concern is soils. In review of remediation guidance (USEPA 1988) and media of concern, the GRAs may include one or more of the following actions summarized below.

General Response Action	Description
No Action	No action is taken to remediate soils and contamination remains in place.
Institutional Controls	Administrative methods that limit land use and access to limit or prevent receptor exposure to contaminated soils.
Monitoring	Continued monitoring of environmental media to observe contaminant concentration changes over time and assess effectiveness of remedial technology.

General Response Action	Description
Containment/Isolation	Physical barriers or structures to contain the contaminated media, to limit or prevent receptor exposure to contaminants.
Removal	Removal of contaminated soil from its original location through excavation.
Treatment	Use of *in situ* or *ex situ* treatment technologies to chemically degrade and/or physically stabilize contaminants.
Disposal	Placement of contaminated media in a new, controlled location onsite or offsite that limits or eliminates potential exposure pathways between receptors and contaminated soils.

3.2.1 No Action

No action is a baseline GRA scenario used for comparing and evaluating against alternative GRAs. No remedial action or monitoring would be performed under the no action GRA. This GRA provides an "as is" baseline assessment of the impact on potential receptors.

3.2.2 Institutional Controls

Institutional controls (ICs) are administrative methods that limit land use or access to prevent receptor exposure to contaminated media left in place at a Site. ICs can be used as the primary component of a remedial alternative or in combination with other remediation technologies and process options (RTPOs) to minimize or prevent exposure from contaminated media kept in place at a given site (USACE and USEPA, 2000). The NCP emphasizes that ICs, such as land-use restrictions, are meant to supplement RTPOs during all phases of remediation and may be a necessary component of the final remedy.

3.2.3 Monitoring

Monitoring is a response action that is commonly combined with other RTPOs to provide the data necessary to determine if the remedial action successfully achieved RAOs and cleanup goals. Monitoring involves media sampling and analysis of contaminant concentrations and other ancillary variables to track the progress and overall effectiveness of a remedial action.

3.2.4 Containment/Isolation

The containment action is intended to contain or isolate COCs in soils from potential receptors and/or environmental media through the use of a physical barrier, thereby breaking a potential exposure pathway. Contaminated soils are kept in place; therefore, the containment/isolation GRA is frequently used in combination with ICs, such as land use restrictions, to verify that the engineered containment system is not disturbed or compromised, and thus provides for long-term protection of human health and the environment.

3.2.5 Removal

This GRA entails the physical action to remove contaminated media from its current location for subsequent treatment and/or disposal. Removal of soil contamination is typically accomplished through excavation. Complete removal of contamination from a site immediately achieves RAOs and cleanup goals; however, full removal is not always achievable due to site-specific limitations (e.g., depth and/or extent of contamination, presence of adjacent structures, presence and depth of groundwater).

3.2.6 Treatment

Treatment involves the use of any chemical, biological, and/or physical process to cause the destruction or alteration of the contamination to a form that is less toxic and/or less mobile. Treatment can be achieved *in situ* (i.e., in place) or *ex situ* (i.e., aboveground following excavation). *Ex situ* treatment can be applied to excavated soils to support disposal of soils [e.g., addition of solidifying agents to pass paint filter and/or toxicity characteristic leaching procedure (TCLP) testing to allow for disposal as a nonhazardous waste].

3.2.7 Disposal

Disposal refers to the placement of excavated soils in an onsite location or an appropriately permitted offsite facility (e.g., a landfill) for protective management that precludes exposure pathways.

3.3 IDENTIFICATION AND SCREENING OF REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS

Remediation technologies refer to general categories of technology types, and process options refer to specific methods or equipment types within each technology type. One or more RTPOs may exist for each GRA (except no action). Applicable RTPOs for the GRAs were identified for OU1 and are summarized below.

General Response Action	Remedial Technology	Process Options
Institutional Controls	Administrative Controls	Deed or Site Use Restrictions
	Engineered Controls	Physical Barriers
Containment/Isolation	Barrier and Source Controls	Cover
Removal	Excavation	Soil Excavation
Treatment	*In Situ* Treatment	*In Situ* Stabilization/Solidification *In Situ* Chemical Amendment
	Ex Situ Treatment	*Ex Situ* Stabilization/Solidification Land Farming Soil Washing

General Response Action	Remedial Technology	Process Options
Disposal	Disposal	Offsite Landfill Disposal Onsite Consolidation

Note: In addition to the applicable RTPOs above, monitoring was identified for further screening since monitoring may supplement and support other RTPOs as part of a complete remedial strategy or design (treatment train).

3.3.1 Criteria for Preliminary Screening of Remedial Technologies and Process Options

The RTPOs identified for soils were evaluated to identify those that are most viable to the site-specific conditions and RAO. Each RTPO was screened against the criteria described below.

- Effectiveness—The effectiveness of an RTPO refers to the likelihood that the technology will be effective at reducing the toxicity, mobility, and/or volume of, or exposure to, the COCs in OU1 given the specific conditions at the Site. Each RTPO was evaluated for effectiveness based on demonstrated success at similar sites/conditions.

- Implementability—This criterion considers the relative ease of implementing the RTPO and considers factors such as availability of the materials and services to implement the RTPO and the depth of contamination.

- Relative Cost—This criterion considers the capital and O&M costs to implement the RTPO.

3.3.2 Identification, Screening, and Evaluation of Technologies

Figure 3-1 summarizes the results of the RTPO screening process, which is described for each GRA below.

Institutional Controls

Although ICs alone do not reduce the toxicity, mobility, or volume of contamination at a site, they can be conditionally effective at preventing exposure of human receptors to contaminated soils. Some common options of ICs are as follows:

- Government Controls—Zoning restrictions or local ordinances
- Property Controls—Deed restrictions, easements, covenants
- Enforcement Permits – Decrees, administrative orders, and contracts
- Information Tools—Public notices, signage.

ICs may be used in combination with other RTPOs to achieve a remedy that is protective of human health and the environment. A common institutional control is a land use or deed restriction that specifies soil handling and management procedures following completion of the remedial action. ICs are implementable and are low cost relative to other RTPOs. Costs consist of the administrative cost for preparing and filing the deed restrictions in addition to periodic inspections

to monitor compliance. Considering the current and future land use of OU1 (commercial/industrial/recreational), ICs are retained for further consideration.

Monitoring

Monitoring involves collection of soil samples to evaluate the extent of contamination and the progress of remedial actions, and to demonstrate that the remedial action has achieved the RAO and cleanup goals. Monitoring is retained as an RTPO to be included as a component of active remedial alternatives.

Containment/Isolation

Containment/isolation technologies isolate contaminants to prevent their migration and/or limit/eliminate potential exposure pathways. Based on the immobility of the contamination present at the Site, a cover is considered more appropriate than an engineered cap. Covers involve the placement of soil and/or geotextile fabric to isolate potential human receptors from contamination in soils. Covers leave contamination in place and are not effective at reducing contaminant toxicity or volume. A cover reduces potential contaminant mobility by stormwater or wind erosion and a low permeability cover can reduce the potential mobility of soil contaminants by limiting infiltration.

ICs are typically implemented with a cover to preserve the integrity of the cover and to verify that proper precautions and practices are implemented during activities (e.g., excavation of utility corridors) that could disturb the cover and lead to potential exposure to contaminated soils beneath the cover. Covers are implementable at the Site and capital cost would be low to moderate. Long-term cost would be required to monitor and maintain the integrity of the cover which may place limits on future construction options. These conditions and the fact that the contamination would remain in place at the Site would limit the future redevelopment options. In conjunction with excavation and removal technologies, a cover could be installed over subsurface soils that contain COCs that pose an unacceptable risk. Therefore, a cover is retained for further consideration for subsurface soils.

Removal

Removal is accomplished via excavation using conventional construction techniques. Removal is highly effective at reducing/eliminating the toxicity, mobility, and volume of soil contamination, and, if successfully implemented, effectively eliminates unacceptable risk to human health or the environment associated with the soil contamination. Excavated soils may be consolidated and placed onsite in an area outside of OU1 or disposed at an appropriately permitted offsite landfill. Because the depth of contamination of OU1 soils does not require excavation below the water table, conventional construction techniques and equipment can be employed and are readily implementable. Removal generally has a high cost relative to other RTPOs. The cost of removal will depend on the waste designation, which is currently under consideration by the USEPA and NC DEQ. A description of the proposed waste designation as non-hazardous is provided in Appendix D. Based on the RAO and future land use, removal is retained as an RTPO for consideration in the development of remedial alternatives.

Treatment

Two *in situ* and three *ex situ* treatment RTPOs were identified as potentially viable for OU1 soils. The screening of these RTPOs is discussed below.

In Situ Stabilization—*In situ* stabilization involves the mixing of chemical reagents, such as cement, to create a solid "monolith" matrix that isolates contaminated soils from potential exposure or migration. Although stabilization has been shown to be highly effective at other wood treating sites, the post-treatment site conditions are inconsistent with the desired future redevelopment of OU1. Stabilization results in a solid matrix that is greater in volume than the original soils, which would place limits on future construction options. These conditions and the fact that the contamination would remain in place at the Site would limit the desirability of OU1 for future redevelopment. As a result, *in situ* stabilization is not retained for further consideration.

In Situ Chemical Amendments—*In situ* chemical amendments involve the addition of specific chemical reagents to either degrade/destroy COCs or bind the COCs in soils and thereby reduce the toxicity, mobility, and volume of the contaminants. Chemical oxidants can be effective for treatment of organic contaminants, such as PAHs; however, the amendments may create adverse effects such as causing leaching of inorganics to groundwater. The technology is implementable; however, the cost can be high depending on the extent of soils requiring remediation. This technology also poses an increased health and safety risk due to the chemical reagents used. Based on the RAO and future land use, *in situ* chemical amendments are not retained for further consideration.

Ex Situ Stabilization—*Ex situ* stabilization involves the mixing of chemical reagents, such as cement, with excavated soils to reduce COC mobility. Commonly, *ex situ* stabilization is used to reduce contaminant mobility in characteristically hazardous wastes (i.e., soils that fail TCLP testing) to allow for disposal in a Subtitle D landfill. The OU1 soils have been shown to be non-hazardous based on characterization of investigation derived waste during RI activities; thus, *ex situ* stabilization is considered unnecessary and is not retained for further consideration.

Ex Situ Land Farming—Land farming involves the placement of excavated soils in treatment cells and rotating or tilling the cells to facilitate the physical (e.g., volatilization, photodegradation) and biological degradation of contaminants. Historically, land farming was commonly applied to treat soils at wood treating sites. However, the technology has had mixed success in the treatment of creosote-impacted soils, especially the heavier constituents such as PAHs. As a result, land farming is not retained for further consideration.

Ex Situ Soil Washing—Soil washing involves contacting excavated contaminated soils with water to remove contaminants by dissolving or suspending them in the wash solution (often augmented with a surfactant or chelating agent to improve contaminant removal efficiency) or by concentrating them into a smaller volume of soil through separation. This technology is a waste-based scrubbing technology that will create an additional waste stream due to the contaminants being transferred to water. The water will likely require treatment and will require disposal. Complex contaminant mixtures, such as creosote, that consist of hydrophobic/low solubility constituents, are challenging to identify an appropriate washing solution adequate to remove contaminants from soil; thus, requiring multiple washing cycles. The cost is moderate to high depending on the contaminant mixture and soil types. Due to the soil types at the Site (silts and clays), contaminant mixture, and potential of creating multiple waste streams, soil washing is not retained for further consideration.

Disposal

Two disposal options were identified as potentially viable for OU1 soils if excavation is selected as a remedial alternative. Excavated soil could either be disposed of at an off-site disposal facility or temporarily stockpiled at an on-site location outside of the OU1 boundary for potential reuse as fill material.

Off-site disposal would require analyzing the soils using the Toxicity Characteristic Leaching Procedure (TCLP) to determine if the soils are hazardous or non-hazardous. Excavated soil characterized as non-hazardous would be disposed in a RCRA Subtitle D solid waste landfill. Excavated soil characterized as hazardous waste would be disposed in a RCRA Subtitle C hazardous waste landfill. Disposal of soil off-site removed long-term monitoring requirements; however, off-site transport results in increased carbon footprint, energy use and traffic safety risks.

On-site disposal would require identifying an on-site location outside of the boundary of OU1 suitable for temporarily stockpiling the soils. The ground surface would be covered with a liner prior to soil placement. The stockpile would be covered and sampled to determine potential reuse. If the soil is deemed usable, the stockpiled soil may be used as fill material in an on-site location outside of the OU1 boundary. If the material is deemed unsuitable for use as backfill, the soil will be disposed offsite.

Reuse of soils would reduce the cost of disposal, reduce the carbon footprint, and is sustainable. The cost of off-site or on-site disposal would be moderate to high. The unit cost for disposal at a RCRA Subtitle C facility is typically much higher than the cost for disposal at a RCRA Subtitle D facility. Disposal is retained as an RTPO, in conjunction with Removal.

3.4 REMEDIAL APPROACH

Site characterization during the RI demonstrated the presence of constituents associated with creosote wood treatment in both surface and subsurface soils in OU1. The HHRA indicated these soils did not pose an unacceptable risk to current or future human receptors based on the current and anticipated future land use of OU1, which is commercial/industrial/recreational. However, an unacceptable risk to human receptors would exist under the residential use scenario based on the HHRA.

Based on the current data, HHRA, and RAO, ICs will be required to permanently restrict land use to commercial/industrial/recreational uses. ICs will also require soil management plans for construction and/or redevelopment activities to manage soils in such a way that they do not pose an unacceptable risk to human health or the environment.

Additional soil data collection has been described in this FFS to refine the OU1 boundaries and address potential uncertainties associated with the current data set. If the results of the additional data collection activities indicate the soils in OU1 pose an unacceptable risk to human receptors under the commercial/industrial/recreational land use scenario, it is expected that the following remedial alternatives would be considered to achieve the RAO.

- If surface soil poses an unacceptable risk, soil excavation/disposal and ICs would be viable as the remedial option
- If subsurface soil poses an unacceptable risk, two remedial options would be evaluated:
    - Soil excavation/disposal and ICs, or
    - Soil excavation/disposal, subsurface cover, and ICs

The detailed analysis of the alternative remedial options is presented in the following sections of this FFS.

4.0 DEVELOPMENT AND SCREENING OF REMEDIAL ALTERNATIVES

This section describes the remedial alternatives that were developed from the RTPOs that were retained during the screening process described in Section 3. Each remedial alternative includes a combination of RTPOs and was developed to provide a range of options for achieving the RAO and ARARs. An analysis of each alternative is presented based on the nine criteria defined under CERCLA. The evaluation of remedial alternatives presented in this FFS assumes that the soils in OU1 will not be considered listed waste. If a future determination is made that listed waste requiring remediation is present in OU1, additional remedial alternatives may need to be considered.

4.1 DESCRIPTION OF REMEDIAL ALTERNATIVES

4.1.1 Alternative 1 – No Action

The no action alternative is required under the NCP to provide a baseline scenario against which other alternatives are compared. Under the no action alternative, no funds are expended for remediation of soils. The minimum activities for the no action alternative include the mandatory five-year reviews over the course of a 30-year period, resulting in a total of six five-year reviews.

4.1.2 Alternative 2 – Institutional Controls

Alternative 2 consists of non-engineered instruments such as land use restrictions, deed restrictions, zoning and building permits, and other administrative and legal controls that limit exposure by preventing residential use in areas where concentrations exceed residential risk thresholds. Under this alternative, no funds are expended for remediation of soils. However, a soil management plan will be required. The IC alternative includes the mandatory five-year reviews over the course of a 30-year period, resulting in a total of six five-year reviews. If required, ICs can be combined with other alternatives.

4.1.3 Alternative 3 – Removal and Disposal

Alternative 3 consists of excavation of soils with COC concentrations that exceed health-based cleanup goals. Assuming that the soils are non-hazardous (not a listed waste; not a characteristic waste), contaminated soils removed by excavation will be disposed as follows:

- as RCRA non-hazardous waste at a Subtitle D landfill approved by EPA to accept non-hazardous waste, or
- soils will be stockpiled at the Site in a location outside of OU1 for potential reuse as fill material

Confirmation sampling and analyses will be performed during excavation activities to demonstrate that cleanup goals have been achieved. Confirmation sampling will be described in the RD. Clean backfill verified by laboratory analysis will be placed in the excavated areas. After excavation, OU1 will require ICs, such as deed restrictions, to limit the use of the property to non-residential (commercial/industrial/recreational).

4.1.4 Alternative 4 – Cover (Contingency for Subsurface Soil Only)

Alternative 4 consists of installing a cover over subsurface soils with COC concentrations that exceed health-based cleanup goals. This alternative will be implemented in conjunction with Alternative 3 (Removal and Disposal) if COCs concentrations in subsurface soils remain above the clean-up goals. After removal of surface soils, placement of the cover and backfilling, OU1 will require ICs such as deed restrictions to limit the use of the property to non-residential (commercial/industrial/recreational) and prevent disturbance of the cover.

4.2 EVALUATION CRITERIA

The nine criteria defined under CERCLA for evaluation of remedial action alternatives fall into three categories—threshold criteria, primary balancing criteria, and modifying criteria.

Each alternative must be capable of meeting the following two threshold criteria:

- *Overall Protection of Human Health and the Environment* - Protectiveness of human health and the environment is based on an evaluation of each alternative's ability to meet the RAO.

- *Compliance with ARARs* - Each alternative is evaluated to determine how it complies with or can be modified to comply with federal and state ARARs.

The comparative analysis of alternatives is then based on the following five primary balancing criteria:

- *Long-Term Effectiveness and Permanence* - This criterion requires an evaluation of the potential long-term risks remaining after implementation of the remedy. Issues addressed for each alternative include the magnitude of long-term risks, and the long-term reliability of the management controls.

- *Short-Term Effectiveness* - The evaluation of short-term effectiveness is based on the protectiveness of human health achieved during the construction and implementation phase of the remedial action. Key factors to be considered by this evaluation include risk to residents, risk to site workers and the community, and the time required to complete onsite construction work.

- *Reduction of Toxicity, Mobility, or Volume through Treatment* - This criterion addresses the preference under CERCLA for remedial alternatives that permanently and significantly reduce the toxicity, mobility, or volume of hazardous substances through treatment.

- *Implementability* - The implement ability of each alternative is evaluated based on its technical and administrative feasibility, and the availability of services and materials. Technical feasibility takes into consideration difficulties that may be encountered during construction and operation. Administrative feasibility factors include coordination with other offices and agencies, such as obtaining permits or approvals for various onsite and offsite activities.

- *Cost* - Evaluation of the cost of each alternative includes estimation of capital costs, operations and maintenance (O&M) costs, and the net present value (NPV) based on a

30-year O&M period.[2] The NPV cost provides a means of comparing the total costs of different alternatives with different O&M requirements and duration. The costs are presented in a format consistent with *A Guide to Developing and Documenting Cost Estimates during the Feasibility Study* (USACE and USEPA 2000).

After EPA issues the Proposed Plan for OU1, the following two modifying criteria will be considered in the Record of Decision (ROD):

- *Regulatory Acceptance*—City and state acceptance will be determined based on comments and input received during the FFS review and approval process.

- Community Acceptance—Formal evaluation of the community responses and/or concerns regarding the alternatives will consider input from the public during public meetings, and written comments on USEPA's proposed plan. However, the FFS informally addresses community acceptance of each alternative based on anticipated feedback and concerns from the community.

4.3 EVALUATION OF REMEDIAL ALTERNATIVES - SOIL

4.3.1 Alternative 1 – No Action

The following table presents an evaluation of the no action alternative relative to the CERCLA criteria.

Criteria	Analysis
Overall Protection of Human Health and the Environment	The no action alternative is not protective of human health or the environment. This alternative does not eliminate any exposure pathways or reduce the level of risk of the existing media contamination.
Compliance with ARARs	Based on the current and anticipated future land use (commercial/industrial/recreational), this alternative does not achieve the RAO or chemical-specific ARARs established for the Site. Location- and action-specific ARARs do not apply to this alternative since remedial actions will not be conducted.
Long-Term Effectiveness and Permanence	The long-term effectiveness of the no action alternative is poor as the current level of contamination and associated risk is not projected to change substantially with time and no controls currently exist to prevent rezoning of land use to residential. Because contaminants would remain under this scenario, a review/reassessment of the conditions at the Site would be performed at 5-year intervals.
Reduction of Toxicity, Mobility, or Volume through Treatment	This alternative will not reduce the toxicity, mobility, or volume of contaminants. The contaminants can be expected to degrade naturally over time; however, an extended time frame (decades) may be required before notable changes in concentrations occur.

[2] A 7% discount rate was used based on EPA guidance.

Criteria	Analysis
Short-Term Effectiveness	This remedy is not expected to have any significant short-term effectiveness.
Implementability	The no action alternative is easily implemented.
Cost	$57,000 Total NPV (-30% to +50%)

4.3.2 Alternative 2 – Institutional Controls

The following table presents an evaluation of the ICs alternative relative to the CERCLA criteria.

Criteria	Analysis
Overall Protection of Human Health and the Environment	The ICs alternative is protective of human health and the environment by preventing receptor exposure to contaminated media. This alternative does not reduce the toxicity of the existing media contamination.
Compliance with ARARs	This alternative may achieve the RAO or chemical-specific ARARs established for the Site. Location- and action-specific ARARs do not apply to this alternative unless combined with other remedial technologies.
Long-Term Effectiveness and Permanence	This alternative will achieve long-term effectiveness and permanence. The current level of contamination and associated risk is not projected to change substantially with time. Therefore, ICs (such as deed restrictions) will be required to prevent rezoning from industrial/commercial/recreational to residential land use. Because contaminants remain under this scenario, a review/reassessment of the conditions at the Site would be performed at 5-year intervals.
Reduction of Toxicity, Mobility, or Volume through Treatment	This alternative will not reduce the toxicity, mobility, or volume of contaminants. The contaminants can be expected to degrade naturally over time; however, an extended time frame (decades) may be required before notable changes in concentrations occur.
Short-Term Effectiveness	This remedy will have short-term effectiveness.
Implementability	The ICs alternative is easily implemented.
Cost	$173,000 Total NPV (-30% to +50%)

4.3.3 Alternative 3 – Removal and Disposal

Removal of soils with concentrations exceeding health-based cleanup goals would be a highly-effective and permanent remedy for soils, and would meet the CERCLA criteria, as summarized below.

Criteria	Analysis
Overall Protection of Human Health and the Environment	This alternative would be protective of human health and the environment by removing soils that contain contaminants at concentrations that exceed health-based levels.
Compliance with ARARs	This alternative would achieve the RAO and meet the chemical-, location-, and action-specific ARARs.
Long-Term Effectiveness and Permanence	This alternative would have a high degree of long-term effectiveness as the soils that contain contaminants at concentrations that exceed health-based cleanup goals would be permanently removed from OU1.
Reduction of Toxicity, Mobility, or Volume through Treatment	Removal would substantially reduce/eliminate the volume of contamination in soils and thereby substantially reduce/eliminate the contaminant toxicity and mobility in OU1.
Short-Term Effectiveness	This alternative would be effective immediately upon completion of the removal action; however, there is the potential for short-term impacts to workers and the community (e.g., due to dust, truck traffic) and for nuisance issues (e.g., odors) during the active remediation construction period. Potential short-term impacts can be readily and effectively managed through well-established engineering controls.
Implementability	This alternative uses well-established techniques and technologies and does not require specialized services or equipment. There are no known challenges to completing this alternative that cannot be addressed through proper engineering design and construction.
Cost	$3,082,000 Total NPV (-30% to +50%)[3]

4.3.4 ALTERNATIVE 4 - COVER (CONTINGENCY FOR SUBSURFACE SOIL ONLY)

Additional subsurface soil samples may be collected as part of the RD to address uncertainties associated with the current data set. Similarly, if Alternative 3 is selected to address surface soil contamination, confirmation soil samples may be collected from the base of the excavation. These additional subsurface soil samples will be combined with the existing subsurface soil samples and the risk associated with subsurface soils in OU1 will be reevaluated.

If the risk evaluation indicates the presence of COCs in the subsurface soils, the concentrations of the COCs will be compared to the PRGs for the construction worker. If the COC concentrations

[3] Cost based on an assumed area and excavation depth of two feet. If additional volume is excavated, the costs will increase. Cost is also based on soils being disposed off-site as non-hazardous waste. Off-site disposal as a hazardous waste would substantially increase the cost for this alternative.

exceed subsurface soil PRGs, removal/disposal (Alternative 3) combined with ICs (Alternative 2) could be implemented to meet the CERCLA criteria described in Section 4.3.3.

If excavation of subsurface soils is deemed unacceptable, a cover could be placed over the subsurface soils prior to backfilling. Placing a cover over subsurface soils containing COCs at concentrations exceeding health-based cleanup goals would be a highly-effective and permanent remedy for subsurface soils and would meet all the CERCLA criteria, as summarized below.

Criteria	Analysis
Overall Protection of Human Health and the Environment	This alternative would be protective of human health and the environment by isolating subsurface soils that contain contaminants at concentrations that exceed health-based levels.
Compliance with ARARs	This alternative would achieve the RAO and meet the chemical-, location-, and action-specific ARARs.
Long-Term Effectiveness and Permanence	When combined with ICs, this alternative would have a high degree of long-term effectiveness as the subsurface soils that contain contaminants at concentrations that exceed health-based levels would be permanently isolated and covered below ground surface.
Reduction of Toxicity, Mobility, or Volume through Treatment	This alternative will not reduce the toxicity or volume of contaminants in subsurface soil; however, the cover will reduce the mobility of the contaminants.
Short-Term Effectiveness	This alternative would be effective immediately upon completion of the remedy. However, there is the potential for short-term exposure to workers and for nuisance issues (e.g., odors). Potential short-term impacts can be readily and effectively managed through well-established controls and PPE
Implementability	This alternative uses well-established techniques and technologies and does not require specialized services or equipment. There are no known challenges to completing this alternative that cannot be addressed through proper engineering design and construction.
Cost	$576,000 Total NPV (-30% to +50%)[4]

[4] This is not a stand-alone cost. Cost assumes that this alternative is conducted in conjunction with Alternative 3 and that the cost for Alternative 4 is added onto the cost for Alternative 3.

5.0 COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES

In this section, the three remedial alternatives identified for OU1, along with contingency Alternative 4 for subsurface soils, are comparatively analyzed against the nine CERCLA evaluation criteria. Figure 5-1 summarizes the results of the comparative evaluation.

5.1 THRESHOLD CRITERIA

Alternative 1 (no action) does not meet the threshold criteria (Table 5-1). The current conditions of OU1 represent an unacceptable, potential hazard, to a future resident and would not meet the RAO without the placement of ICs to restrict usage to non-residential . Without active remediation or engineering and/or ICs, there is a potential risk of exposure to OU1 soils to a future resident.

Alternative 2 (ICs) will meet the threshold criteria as exposure to OU1 soils would be managed and the RAO would be achieved. Alternative 3 would also meet the threshold criteria and the RAO by removing OU1 soils with concentrations of COCs above health-based cleanup goals and replacing those soils with clean backfill. Alternative 3 would comply with federal, state, and local ARARs. Implementing Alternative 4 for subsurface soils above the PRGs will meet the threshold criteria and ARARs if performed in conjunction with implementing ICs and Alternative 3.

5.2 BALANCING CRITERIA

Table 5-2 presents a comparative analysis of the four remedial alternatives in terms of the balancing criteria (except for cost).

Although the no action alternative, by definition, would be inexpensive and readily implementable, it does not attain the objectives of long-term effectiveness and permanence, short-term effectiveness, or reduction of toxicity, mobility, and volume through treatment. Given the current data set and results of the HHRA, the IC alternative would be inexpensive and readily implementable and would attain the objectives of long-term and short-term effectiveness. However, under the IC alternative, there would be no reduction of toxicity, mobility or volume. If additional sampling indicates an unacceptable risk to industrial receptors, the removal/disposal alternative would be readily implementable and would attain the objectives of long-term and short-term effectiveness and reduction of toxicity, mobility, and volume. However, the costs would be fairly high.

The following paragraphs discuss each of the active remedial alternatives (Alternatives 2, 3,and 4) with respect to the balancing criteria.

5.2.1 Long-Term Effectiveness and Permanence

Alternatives 2 3 and 4 would substantially attain the criteria of long-term effectiveness and permanence (Table 5-2); however, only Alternative 3 would eliminate soils with COC concentrations above health-based cleanup goals. Under Alternative 3, excavated soils would either be disposed of in an offsite landfill or stockpiled at the Site in an area outside of the boundary of OU1 for potential later re-use as fill material. Alternative 4 would be implemented in conjunction with Alternative 3 if subsurface soils contain COCs at concentrations above industrial PRGs.

5.2.2 Short-Term Effectiveness

Alternatives 2, 3, and 4 would be immediately effective upon completion of the remedial action. Alternatives 3 and 4 would involve the use of conventional construction techniques. Potential short-term impacts to workers and the community can be readily addressed though proper design and execution of the remedial action, including use of well-established best management practices. Many of the potential short-term impacts and nuisances associated with this remedy are related to the excavation, stockpiling, and transport of contaminated soils or constructing cover over subsurface soils. Some of the key factors related to Alternative 3 include, but are not limited to:

- Inherent hazards associated with the use of heavy machinery
- Potential to generate dusts, chemical vapors, and odors that, without proper controls, can represent a hazard or at least a nuisance to both workers and the adjacent community
- Truck traffic and associated risk and nuisance posed to the community
- Noise associated with use of heavy machinery and truck traffic
- Potential for release of contaminants to the environment during handling and transport of excavated soils, and due to potential stormwater contact with excavated surfaces and stockpiles.

5.2.3 Reduction of Toxicity, Mobility, and Volume

With the removal of contaminated soils above health-based cleanup goals in OU1, Alternative 3 would substantially reduce the toxicity, mobility and volume of contamination. Alternative 4 does not reduce toxicity or volume; however, the cover will isolate and reduce the mobility of subsurface soils.

5.2.4 Implementability

Alternatives 3 and 4 are relatively easy to implement and involve readily available and highly reliable technologies and equipment, and the effectiveness of both alternatives can be readily evaluated through monitoring. Alternative 2 does not pose any significant impediments to additional remedial actions in the future, while on-site disposal under Alternative 3 may pose some minor impediment to additional remedial action should it be warranted in the future. With on-site consolidation, Alternative 3 also poses a potential logistical challenge. Because the potential remedial action(s) for the areas outside the OU1 boundary have not been selected, it is not clear at this time whether consolidation of OU1 soils on Site would be compatible or inconsistent with the final remedy selected for that area of the Site. Further, the schedule for excavation and stockpiling of OU1 soils at another Site location would need to be coordinated with implementation of the Site remedial action.

5.2.5 Costs

At an estimated cost of $173,000, Alternative 2 is the lowest cost acceptable alternative. Alternative 3 is estimated to cost $3,082,000. Alternative 4 is estimated to cost $576,000;

however, it is assumed that Alternative 4 will be performed in conjunction with Alternative 3. A detailed cost estimate is provided as Appendix E.

5.3 MODIFYING CRITERIA

It is anticipated that Alternative 1, no action, would not be accepted by the regulatory agencies or the community, nor would it be consistent with future redevelopment of OU1. Alternative 2 is anticipated to be acceptable to the regulatory agencies and the community if the additional sampling shows that the chemical concentrations in OU1 soils do not pose an unacceptable risk based on commercial/industrial/recreational land use. It is anticipated that Alternative 3 would be favored by the regulatory agencies and by the community if the sampling identifies an unacceptable risk based on commercial/industrial/recreational land use, as it is the most effective and permanent remedy.

6.0 REFERENCES

Catlin, 2002. Preliminary Site Assessment for Parcel #5 - Former Cumulus Broadcasting Inc., Parcel #6 - Kerr-McGee Corporation, Bridge 1 over Sturgeon Creek on SR 1435 (Navassa Road). Brunswick County, North Carolina. March 2002.

Catlin, 2003. Soil Sampling Report. Brunswick County, North Carolina. April 2003.

EarthCon, 2019a. Remedial Investigation Report, Kerr-McGee Chemical Corp – Navassa Superfund Site, Navassa, NC, EarthCon Consultants of North Carolina, P.C., _____ 2019.

EarthCon, 2019b. Human Health Risk Assessment, Kerr-McGee Chemical Corp – Navassa Superfund Site, Navassa, NC, EarthCon Consultants of North Carolina, P.C., _____ 2019.

ENSR, 2005. Revised Expanded Site Inspection Report, Kerr McGee Chem Corp Site, Navassa, NC, ENSR Corporation, August 2005.

KMCC, 1984, Kerr-McGee Chemical Corporation Letter to the North Carolina Division of Health Services with Background Information for the North Carolina CERCLA Evaluation, August 14, 1984.

NCDEHNR, 1989. N.C. Department of the Environment and Natural Resources, Site Inspection Report, February 1989.

NCDEHNR, 1995. SI Prioritization (SIP) Report, Kerr McGee Chemical Corp. Site, Navassa, NC North Carolina DEHR, April 24, 1995.

NCDEHNR, 1998. Memorandum of Off-Site Visit, Kerr-McGee Chemical Corp. Navassa, NC North Carolina DEHR, April 17, 1998.

NCDENR, 2003. Site Re-Assessment, Kerr-McGee Chemical Corp., Navassa, Brunswick County, NC. March 2003.

Ramboll, 2019. Baseline Ecological Risk Assessment, Kerr-McGee Chemical Corp – Navassa Superfund Site, Navassa, NC, Ramboll, January 2019.

Town of Navassa, 2011. Official Zoning Map, Town of Navassa. November 4, 2011.

USACE and USEPA. 2000. A guide to developing and documenting cost estimates during the feasibility study. EPA 540-R-00-002. OSWER 9355.0-75. U.S. Army Corps of Engineers, Hazardous, Toxic, and Radioactive Waste Center of Expertise, Omaha, NE, and U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC. July.

USEPA, 1989. Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual, Part A. Interim Final. EPA/540/1-89/002. Office of Emergency and Remedial Response, Washington, DC. December 1989.

USEPA. 1991. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual, (Part B, Development of Risk-based Preliminary Remediation Goals. EPA/540/R-92/003. Office of Emergency and Remedial Response, Washington, DC.

USEPA, 2002. *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites*. OSWER 9355.4-24. Office of Solid Waste and Emergency Response, US Environmental Protection Agency. Washington, DC, 2002

USEPA, 2009. Hazard Ranking System (HRS) Documentation Record, Kerr-McGee Chemical Corp – Navassa, September 2009.

USEPA, 2018a. Regional Screening Levels for Chemical Contaminants at Superfund Sites, May 2018.

USEPA, 2018b. U.S. Environmental Protection Agency Region 4 TSS, *Human Health Risk Assessment Supplemental Guidance,* March 2018.

USGS, 2003. Hydrogeology and Ground-Water Quality of Brunswick County, North Carolina, Water Resources Investigation Report 03-4051.

Assessment of Proposed Plan Kerr-McGee Chemical Corp–Navassa Superfund Site Operable Unit 1

Dr. John H Pardue

Below is an assessment of the proposed plan for the disposition of Operable Unit 1 (OU-1) of the Kerr-McGee Chemical Corp Superfund Site[1]. I am the Elizabeth Howell Stewart Professor of Civil & Environmental Engineering at Louisiana State University in Baton Rouge, Louisiana. At LSU, I serve as the Director of the Hazardous Substance Research Center and the Coordinator of the Environmental Engineering program. My areas of expertise in environmental engineering and science include the remediation of hazardous materials in the environment, the fate of crude oil in coastal environments, environmental exposure assessment of pollutants and the environmental impacts of hurricanes and other disasters. I have led or participated in projects exceeding 20 MM dollars in external funding from agencies such as the Environmental Protection Agency, Gulf of Mexico Research Initiative, National Science Foundation, the Louisiana Oil Spill Coordinators Office and the Department of the Interior. I have been active in the research response to the *Deepwater Horizon* oil spill since April 2010 and have worked extensively in the fate and transport of PAHs, the primary contaminants at the Kerr-McGee site. In addition to my academic research, I have a record of consulting at contaminated sites in the areas of remedial design, fate and transport of chemicals, historical waste disposal practices and spill response. I have consulted on remedial approaches at a dozen Superfund sites and these efforts have guided remedy selections at several sites including sites at the Aberdeen Proving Ground in Maryland, the Petro Processors site in Louisiana and the ReSolve, Inc. site in Massachusetts. At the ReSolve site, we recently transitioned groundwater treatment to a sustainable, anaerobic bioreactor system developed in my laboratory. The system is run entirely on solar power. We received the 2014 Ira B. Leighton award from the Environmental Business Council of New England for the design and implementation of the system. In Louisiana, I utilized a novel anaerobic bioremediation process to achieve clean closure of a benzene-contaminated groundwater site in Vermillion Parish, LA.

For this assessment, I reviewed the proposed plan for OU-1[1], the Remedial Investigation (RI) from 2019[2], the original risk assessment[3] the most recent risk assessment addendum[4] and the draft focused feasibility study for OU-1 [5]. I have also reviewed the underlying data in the RI and the supplemental soil sampling[6] conducted to close data gaps for the recent risk assessment

---

[1] *Proposed Plan Kerr-McGee Chemical Corp–Navassa Superfund Site Operable Unit 1*, Oct. 2019, 21 pp.
[2] *Final Remedial Investigation Report Kerr-McGee Chemical Corp – Navassa Superfund Site, Navassa, North Carolina*, EPA ID #NCD980557805, 3081 pp.
[3] *Human Health Risk Assessment, Kerr-McGee Chemical Corp - Navassa Superfund Site, Navassa, North Carolina*, April 2019, 299 pp.
[4] *Human Health Risk Assessment Addendum, Kerr-McGee Chemical Corp – Navassa Superfund Site Navassa, North Carolina*, August 2019, 268 pp.
[5] Focused Feasibility Study Report , Operable Unit 1, *Kerr-McGee Chemical Corp – Navassa Superfund Site Navassa, North Carolina*, February 2019, 38 pp.
[6] *2019 Soil Sampling Technical Memorandum Kerr-McGee Chemical Corp – Navassa Superfund Site, Navassa, North Carolina*, 13 pp.

addendum. I am conducting this assessment for the Southern Environmental Law Center. My findings are described below.

1. **The division of the former OU-1 into arbitrary areas should not dictate final remediation decisions.** The risk assessment addendum was prepared to recalculate risk on 5 arbitrarily divided parcels in OU-1, presumably the storage area for untreated and treated wood in the former facility. These parcels were sized to represent a "typical" industrial site that might be reused in the future. Through this process, individual risk assessment scenarios were reexamined for each parcel (1A, 1B, 1C, 1D and 2) and additional soil and subsoil sampling was conducted to close data gaps[7]. This effort resulted in the plan recommending the realignment of OU-1 so that it contains just 3 of the 5 parcels (1A, 1B and 2), each of which fell below criteria for carcinogenic and non-carcinogenic risk. As a result, a decision of no further action for these 21.6 acres is recommended[8]. Yet the plan's attachment to these arbitrary divisions of the site creates a significant problem both in the scope and logic of the plan. Once the additional data was collected, the distribution of PAHs came into much clearer focus, including the distribution of the primary driver of risk, benzo(a)pyrene. In Area 1B (and 1C), non-uniform, "hot spots" of contamination explain the spatial PAH distribution. Specifically, these include locations in Area 1B centered around TB-05[6] and in Area 1C, centered around TB-16 and TB-11. These areas, all of which were identified by soil staining visible on historical aerial imagery, are adjacent to each other and aligned along a north-south transect. These locations clearly seem to be associated with the same activities at the site, both located behind a row of small structures on the eastern side of the former OU-1 in aerial imagery. Their concentrations profiles are similar and while most of the contamination is at the surface (0-1'), several locations include deeper contamination (i.e., TB-5, TB-7 and TB-11). To treat one hot spot differently from another due to an arbitrary boundary is not consistent with practices I have observed at other sites. These locations in Areas 1B and 1C should be grouped together and remediation performed consistently on both.
2. **The non-uniform distribution of PAHs in Area 1B (and Area 1C) creates opportunity for cost effective remediation.** Exposure from PAHs in Area 1B (and 1C) is primarily from these hot spots. The exposure point concentrations (EPCs) calculated from these distributions in each parcel reflect this. EPCs for benzo(a)pyrene in 1B (4.13 mg/kg) (and for Area 1C ,13.18 mg/kg) are heavily influenced by the concentrations in these locations, which can be illustrated by comparing the EPC (4.13 mg/kg) and the arithmetic mean of the benzo(a)pyrene concentration (2.54 mg/kg)[9]. EPCs that exceed the arithmetic mean occurs in contaminant distributions that are highly skewed, being influenced by a few elevated concentrations in locations such as those described above. On a surface area basis, these hot spots appear to be less than 10% of the area in Area

[7] *Human Health Risk Assessment Addendum, Kerr-McGee Chemical Corp – Navassa Superfund Site Navassa, North Carolina*, August 2019, 268 pp.
[8] *Proposed Plan Kerr-McGee Chemical Corp–Navassa Superfund Site Operable Unit 1*, Oct. 2019, 21 pp.
[9] Similarly, for Area 1C, the EPC of 13.18 mg/kg is much higher than the arithmetic mean of 4.38 mg/kg.

1B. Yet diluting[10] the EPC in Area 1B by drawing a random boundary is inappropriate and is not consistent with the goals of this program to protect human health and the environment. Rather this PAH distribution creates the opportunity for targeted, cost-effective remediation to fully restore the potential uses for the site[11]. With the objective of restoration of OU-1 for a variety of uses, the remedy would include surface soil removal actions at the hot spots, which consistently showed elevated concentrations in the top foot of soil with a few deeper penetrations. This depth extent, coupled with the spatial extent knowledge described above, suggests that very cost effective risk reduction could be deployed at hot spots in 1B (and 1C for that matter). The details of this remedy were described in the draft focused feasibility study from February 2019[12]. On a unit basis, soil removal could be even more cost effective if conducted with the presumed removal actions that will occur at the other operable units. For example, if even 10% of Area 1B was remediated and the top foot was removed and disposed of at $365/ton[13], the total cost would be less than $500,000[14]. This compares favorably to estimated costs of soil removal across the entire OU-1 of ~3 million dollars in the focus feasibility study estimate[12]. While the surface distribution of PAHs is much better understood now in Area 1B, some refinement would likely be necessary to completely guide remediation, as acknowledged in the uncertainty analysis provided in the risk assessment addendum. Yet, the efforts to identify the locations for the supplemental soil sampling[15] happened upon a very helpful method to guide that refinement; the use of historical images of soil staining. In every spot where soil staining was observed in the imagery, elevated PAHs, and specifically benzo(a) pyrene, were observed. This would make the soil removal even more cost-effective. Reducing this unit cost by conducting the remediation simultaneously with Area 1C , for example, is another reason why OU-1 should not be arbitrarily divided.

3. **Targeted remediation would allow unrestricted uses of the property in the future.** In the current plan, Area 1B would be available for these other uses (commercial, industrial or recreational) but remediation at the hot spot around TB-05 would not be conducted. This location is being addressed inconsistently, simply because it falls north of an arbitrary boundary. The heavy PAHs in creosote, including the carcinogen benzo(a)pyrene, have very slow natural attenuation rates so its presence on the property would be over a very long time frame. Yet what has been learned recently

---

[10] In this context, *dilution* refers to grouping smaller areas of high soil contamination with larger areas of lower soil contamination to artificially manipulate the EPC to minimize risjs

[11] For Area 1C, the hot spots represent less than 20% of the total area. In the revised risk assessment, only the lifetime resident scenario in Area 1C rose to the level of a concern (1.7×10^{-4} versus 1×10^{-4}) suggesting that targeted remediation could mitigate risk in the hot spots.

[12] Focused Feasibility Study Report , Operable Unit 1, *Kerr-McGee Chemical Corp – Navassa Superfund Site Navassa, North Carolina*, February 2019, 38 pp.

[13] https://frtr.gov/matrix2/section4/4-29.html

[14] Area 1B is 8.01 acres. 10% = 0.801 acres or 34,892 ft^2 and excavation to a depth of 1 foot would generate 34,892 ft^3 or 1292 yd^3 of soil. A yd^3 of soil weighs approximately 1 ton. Excavation and disposal at $365/ton would require $471,860.

[15] *2019 Soil Sampling Technical Memorandum Kerr-McGee Chemical Corp – Navassa Superfund Site, Navassa, North Carolina*, 13 pp.

through the risk assessment addendum and supplemental sampling are that the remaining risks to the community in OU-1 can be cost-effectively managed by targeted hot spot remediation in these areas in 1B (and in 1C). This would be particularly effective in areas guided by the historical aerial imagery. This will open the property up to unrestricted uses in the future and eliminate the burden on the community to manage any necessary institutional controls into the indefinite future. This is important as the community tries to understand their risks in using the property since the risk assessments present scenarios (indoor and outdoor workers or trespassers) that don't align with their desired use of the property.

4. **Recreational users potential exposures are not adequately considered in any of the scenarios in the risk assessment addendum.** The plan for OU-1 specifically addresses the use of the areas for recreational purposes, although the risk assessment addendum doesn't directly address the recreational adult or child scenario. Instead, the risk assessment uses a trespasser/visitor scenario to represent the recreational exposure, assuming 2 hours a day of exposure time on site. In the risk assessment addendum, the justification for the 2 hour assumption cites the USEPA Regional Screening Level User's Guide[16] stating that the parameter is site specific and based on professional judgement. Yet no information was presented on why the 2 hour exposure assumption was made for this community and what recreational uses this assumption is made to represent. Are these baseball fields? Jogging trails? Wildlife areas? Are these sports participants? Game officials? Also, it is not necessary that the visitor trespasser scenario be simply ported over for the recreational user. For example, at another site, the trespasser scenario was short visits, 24 days per year for 24 years and the recreational user was 195 days per year at the site in recreational activities[17]. The risk assessment scenario for the recreational user should be reconsidered, both to justify the details of the scenario and the nature of the hot spot exposure in Area 1B (and 1C). Given the distribution of contaminants in Area 1B, for example, exposure would seem to be controlled by how often the recreational child or adult uses the area around TB-5.

[16] https://www.epa.gov/risk/regional-screening-levels-rsls-users-guide accessed December 6, 2019

[17] Baseline Human Health Risk Assessment for the Westinghouse Hematite Site, rev. 1, EO-05-003, 67 pp.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

Mr. Nicholas Jimenez
Southern Environmental Law Center
601 West Rosemary Street
Suite 220
Chapel Hill, North Carolina 27516

RE: Freedom of Information Request No. EPA-R4-2018-005970

Dear Mr. Jimenez:

This letter is in response to your Freedom of Information Act (FOIA) request of March 29, 2018, which was initially denied to give EPA an opportunity to contact submitters of those records covered under a confidentiality claim and requested by you in response to the above-referenced FOIA matter. On May 23, 2018, in keeping with our requirements for processing records under an expressed confidential business information claim (proprietary business information), we provided Greenfield Environmental Multistate Trust Group (GEMTG) an opportunity to substantiate their confidentiality claim for records requested under the FOIA request identification number listed above.

On June 15, 2018, GEMTG provided redacted copies of their Third Quarter 2017 Financial Statement and the 2018 Budget for the Kerr-McGee, Navassa North Carolina Site. Pursuant to our telephone conversation on June 19, 2018, please review the attached redacted versions of the requested records and let us know if the redacted versions of these records will satisfy your request. However, if you still need the unredacted versions of these records, EPA, Region 4 will have to make a **final** release determination regarding these records. Please contact us by July 5, 2018, to let us know how you wish to proceed.

Should you have questions regarding this response, please contact Kathy Armstrong, Government Information Specialist, at (404) 562-8225, or armstrong.kathy@epa.gov.

Sincerely,

LouAnn Gross

LouAnn Gross, Chief
FOIA and Records Management Branch

Attachments

Greenfield Environmental Multistate Trust, LLC
Trustee of the Multistate Environmental Response Trust
Greenfield Environmental Trust Group, Inc., Member
PO Box 1189, Helena, MT 59624
Telephone: (406) 457-2142
jr@g-etg.com

December 24, 2017

By Electronic Mail – spalvins.erik@epa.gov

Erik Spalvins
U.S. Environmental Protection Agency

Subject: 2018 Budget for Former Kerr-McGee Site in Navassa, North Carolina

Dear Mr. Spalvins:

Greenfield Environmental Multistate Trust, LLC, not individually but solely in its representative capacity as Trustee of the Multistate Environmental Response Trust (the Multistate Trust), respectfully submits the draft 2018 Environmental Cost Account (ECA) Budget (the 2018 ECA Budget) for the former Kerr-McGee Site in Navassa, North Carolina (the Site). The 2018 ECA Budget, which is set forth in the attached Exhibit I, is hereby submitted for review and approval to the U.S. Environmental Protection Agency (EPA), as Lead Agency for the Site, pursuant to the requirements of Section 3.2.4 of the Multistate Environmental Response Trust Agreement (the Trust Agreement). Please confirm that EPA will provide a copy of the 2018 ECA Budget to the North Carolina Department of Environment and Natural Resources (NCDENR), as Non-Lead Agency for the Site, if NCDENR has requested consultation on the budget for the Site.

Pursuant to Section 3.2.4 of the Trust Agreement, no expenses may be incurred or paid by the Multistate Trust that are "inconsistent with an approved budget or an approved revised line item for an approved budget," except for ongoing or recurring expenses approved in the previous year. Therefore, the Multistate Trust will continue performing all management, operations, maintenance and other environmental actions that were included in the approved 2017 ECA Budget pending EPA's approval of the 2018 ECA Budget for the Site.

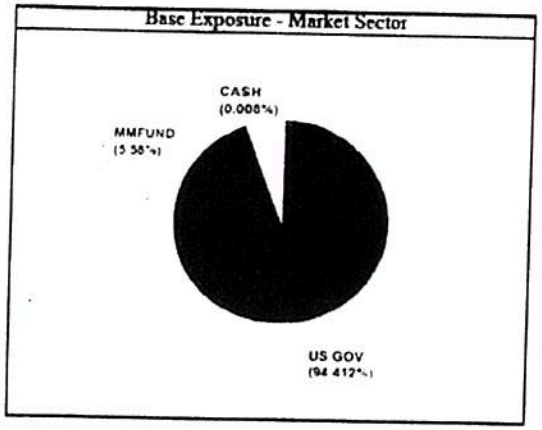
In order to fulfill the Multistate Trust's obligations to perform Environmental Action at the Site (including work planned for 2018) and our shared goal of protecting public health and the environment, the Multistate Trust is requesting that EPA provide its written response to this budget submittal as soon as possible, but by no later than Monday, January 15, 2018.

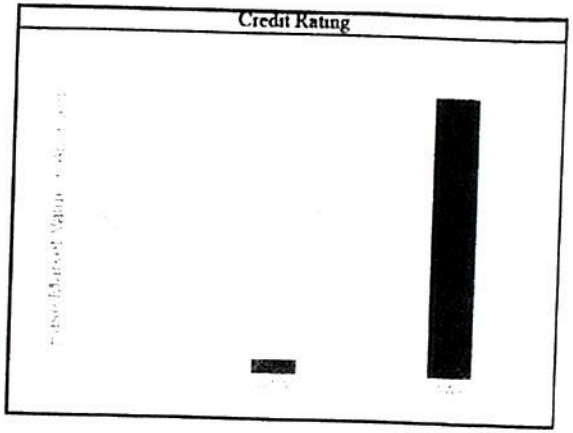
Please contact me or Cindy Brooks, Managing Principal of the Multistate Trust, if you have any questions or would like to arrange a conference call to discuss the proposed 2018 ECA Budget further.

[redacted]

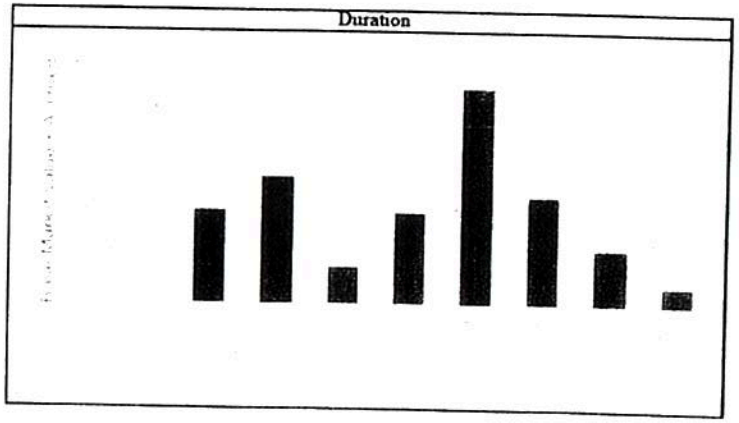
Report: Quarterly Presentation
Account: [redacted]
Date: 0[illegible] 01 201[illegible] 09 30 201[illegible]

Cash and Fixed Income Summary		
Risk Metric		Market Value
Cash		3,185
Treasury MMFund		2,218,280
Fixed Income		37,532,011
Total Portfolio	$	**39,753,477**
Duration	1.29	
Years to Final Maturity	1.315	
Yield	1.36	
Avg Credit Rating	AA+/Aa1/AA+	
Interest Income	$	**101,337**





Issuer Concentration	
Issuer Concentration	Market Value
Government of the United States	94.4%
Treasury MMFund	5.6%
Cash	0.0%
Total Portfolio	**100.0%**



Compliance Overview	
Status	Compliant
As of	09/30/2017

See Accountant's Compilation Report

Thank you in advance for your prompt consideration of this request.

Sincerely,

Greenfield Environmental Multistate Trust, LLC
Trustee of the Multistate Environmental Response Trust
By: Greenfield Environmental Trust Group, Inc., Member

Jennifer Roberts

Name: Jen Roberts
Title: Director of Financial Affairs

Attachment

cc: Kevin Beswick, EPA
Cynthia Brooks, Multistate Trust
Richard Elliott, Multistate Trust
Tasha Lewis, Multistate Trust
Marc Weinreich, Multistate Trust

2018 Budget Forecast for Navassa, North Carolina Environmental Cost Account (ECA)
(Multistate Trust Cost Code #XX)
Greenfield Environmental Multistate Trust LLC,
Trustee of Multistate Environmental Response Trust (Multistate Trust)
Submittal to: US Environmental Protection Agency (Region 4) on December 24, 2017

Exhibit I

Summary of Site Work Completed in 2017 and Planned for 2018:

Work Completed in 2017: Completed remaining RI field work, including soil sampling, surface water/sediment sampling, tidal study, groundwater well monitoring, survey and sampling, offsite soil sampling, and IDW management; Prepared the Draft and Final Remedial Investigation Report; Prepared the Human Health Risk Assessment; Prepared the BERA Report, performed Site road improvements; demolished and removed structures from the residential property, and initiated the Redevelopment Planning Initiative.

Work Planned for 2018: Complete RI report. Complete Human Health and Ecological Risk Assessments. Start Site Feasibility Study. Conduct interim actions and marsh pilot studies. Continue the Navassa Redevelopment Plan Initiative.

Cost Center	Cost Center Description	Total Approved 2017 Budget	Project Costs incurred in 2017 (as of 09/30/2017)	2018 Budget	2018 Scope of Work
XX.A	Regulatory Compliance and Site Operations/Maintenance	$10,000	$0	$160,000	[redacted]
XX.C	New Environmental Actions	$3,104,000	$1,514,420	$7,149,000	[redacted]
XX.D	Multistate Trust Technical Team/Project Management	$553,000	$355,825	$739,000	[redacted]
XX.E	Multistate Trust Fees/Expenses	$163,000	$82,003	$171,000	[redacted]
XX.F	Regulator Oversight Costs	$500,000	$0	$500,000	[redacted]
XX.G	Legal Fees and Accounting Fees	$70,000	$62,340	$109,000	[redacted]
XX.I	Lease & Property Use (Income & Costs)	$0	$0	$0	[redacted]
XX	Total Navassa ECA 2018 Budget	$4,400,000	$2,014,588	$8,828,000	
	Total Navassa ECA Estimated Funding at Beginning of 2018 Budget Year*			$38,834,408	[redacted]
	Navassa ECA Estimated Funds Remaining (Post 2018)			$30,006,408	[redacted]
	Estimated Balance SA (Post 2018)			$3,634,533	[redacted]
	Estimated Balance AA (Post 2018)			$46,252,100	
	Estimated Balance TOTAL (Post 2018)			$79,893,041	

*This is a projection based on actuals and estimates and is subject to change once final costs have been received. Actual balances are presented in the quarterly distributed financial statements

This Single Page Document Constitutes the Annual Budget Submitted to the Lead Agency under Section 3.2.4 of the Multistate Environmental Response Trust. Supplemental Worksheets, if any, Do Not Comprise a Portion of the Annual Budget

GREENFIELD
ENVIRONMENTAL TRUST GROUP

Greenfield Environmental Multistate Trust LLC,
Trustee of the Multistate Environmental Response Trust
By Greenfield Environmental Trust Group, Inc., Member
P.O. Box 1189 Helena, Montana 59624
Telephone: (406)457-2142
Email: jr@g-etg.com

EXHIBIT B -- CONFIDENTIAL BUSINESS INFORMATION REDACTED

February 16, 2018

By Electronic Mail

Bill Denman
Environmental Protection Agency

Erik Spalvins
Environmental Protection Agency

Jim Bateson
North Carolina Department of Environment & Natural Resources

Dan Hirschman
North Carolina Department of Justice

Christopher Cole
Environmental Protection Agency

Dave Mattison
North Carolina Department of Environment & Natural Resources

Jay Osborne
North Carolina Department of Justice

Subject: Third Quarter 2017 Financial Statements

Greenfield Environmental Multistate Trust, LLC, Trustee of the Multistate Environmental Response Trust (the Multistate Trust), hereby submits the attached financial statements for the Multistate Trust - Navassa Account to the beneficiaries.

The attached financial statements cover the period ending September 30, 2017 and year ending December 31, 2016 and are submitted pursuant to the Multistate Trust's obligations under ¶6.1 of the Environmental Response Trust Agreement.

Please do not hesitate to contact me, Cindy Brooks, or Marc Weinreich with any questions pertaining to the attached.

Sincerely,

Greenfield Environmental Multistate Trust, LLC
Trustee of the Multistate Environmental Response Trust
By: Greenfield Environmental Trust Group, Inc., Member

Jen Roberts, CPA

Name: Jennifer Roberts, CPA
Title: Director of Financial Affairs

Enclosure
cc: Cynthia Brooks
Marc Weinreich
Nathan D McCarthy – Wipfli LLP

WIPFLi
CPAs and Consultants

Wipfli LLP
[illegible]
Helena, MT [illegible]
[illegible] North [illegible]
Helena, MT [illegible]
[illegible]
[illegible]
[illegible]

Accountant's Compilation Report

To the Trustees and Beneficiaries
Greenfield Environmental Multistate Trust Group LLC
Trustee for the Multistate Environmental Response Trust
Navassa

The Trustees are responsible for the accompanying special purpose financial statements of Navassa, which comprise the statements of net trust assets as of September 30, 2017 and December 31, 2016, and the related statements of changes in net trust assets for the nine months ended September 30, 2017 and the year ended December 31, 2016 and for determining that the special purpose basis of accounting is an acceptable financial reporting framework We have performed a compilation engagement in accordance with *Statements on Standards for Accounting and Review Services* promulgated by the Accounting and Review Services Committee of the AICPA We did not audit or review the financial statements nor were we required to perform any procedures to verify the accuracy or completeness of the information provided by the trustees Accordingly, we do not express an opinion, a conclusion, nor provide any form of assurance on these financial statements

The financial statements are prepared in accordance with the special purpose basis of accounting in accordance with the requirements of the Trust's obligations under ¶6 1 of the Environmental Response Trust Agreement, which is a basis of accounting other than accounting principles generally accepted in the United States

Management has elected to omit substantially all the disclosures ordinarily included in financial statements prepared in accordance with the prescribed format basis of accounting If the omitted disclosures were included in the financial statements, they might influence the user's conclusions about the Trust's assets, liabilities, net assets, additions, and deductions Accordingly, the financial statements are not designed for those who are not informed about such matters

Supplementary Information

The [redacted] and Budget vs Actual supplementary information is presented for purposes of additional analysis and is not a required part of the special purpose financial statements This information is the representation of the trustees The information was subject to our compilation engagements, however, we have not audited or reviewed the supplementary information and, accordingly, do not express an opinion, a conclusion, nor provide any form of assurance on such supplementary information

We are not independent with respect to Multistate Environmental Response Trust

Wipfli LLP

Wipfli LLP
January 19, 2018
Helena, MT

Multistate Environmental Response Trust
Statements of Net Trust Assets
Navassa ECA
As of September 30, 2017 and December 31, 2016

	9/30/2017	12/31/2016
Assets		
Cash, Wells Fargo - ECA	$ 330,949.72	$ 509,541.65
Receivables - ECA	13,158.14	32,681.48
Waterfall Receivable		234,826.00
Investments, US Bank - ECA	39,753,476.66	41,402,836.59
Investments, US Bank - SA	3,635,617.10	3,616,810.99
Investments, US Bank - AA	46,267,740.04	46,032,831.21
Total Assets	$ 90,000,941.66	$ 91,829,527.92
Liabilities		
Accounts Payable - ECA	$ 591,555.26	$ 877,697.74
Accounts Payable - SA and AA	16,724.67	37,683.54
Net Trust Assets, Navassa	89,392,661.73	90,914,146.64
Total Liabilities & Net Trust Assets	$ 90,000,941.66	$ 91,829,527.92

Statements of Changes in Net Trust Assets
For the Nine Months Ended September 30, 2017 and Year Ended December 31, 2016

	Nine Months Ended 9/30/2017	Year Ended 12/31/16
ECA - Deductions from Net Trust Assets:		
A - Regulatory Compliance/ O&M	$ -	$ -
C - New Environmental Actions	1,514,419.44	1,544,052.59
D - MST Tech Team/Project Mgmt	355,825.64	299,491.84
E - Trustee Fees & Expenses	82,002.96	120,839.13
G - Legal & Accounting Costs	62,340.40	40,422.43
Total Deductions from Net Trust Assets	2,014,588.44	2,004,805.99
ECA - Additions to Net Trust Assets:		
Waterfall distribution of net proceeds from sale of property(1)	-	234,826.00
Investment income, net of expenses	262,302.81	231,228.07
Unrealized gain (loss) on investments	(43,873.09)	102,496.52
Change in Net Trust Assets - ECA	(1,796,158.72)	(1,436,255.40)
SA and AA - Additions to Net Trust Assets:		
SA: Investment income, net of expenses	26,472.01	25,712.51
SA: Unrealized gain (loss) on investments	(7,577.56)	(1,193.74)
AA: Investment income, net of expenses	311,901.77	130,884.38
AA: Unrealized gain (loss) on investments	(56,122.41)	277,253.53
Change in Net Trust Assets - SA and AA	274,673.81	432,656.68
Net Trust Assets, Navassa Beginning	90,914,146.64	91,823,585.36
Anadarko Settlement Distribution - AA	-	94,160.00
Net Trust Assets, Navassa End	$ 89,392,661.73	$ 90,914,146.64
Fund balance - ECA	$ 39,506,029.26	$ 41,302,187.98
Fund balance - SA	3,634,532.68	3,615,638.23
Fund Balance - AA	46,252,099.79	45,996,320.43
	$ 89,392,661.73	$ 90,914,146.64

(1) Per Section 2.11.1 of the Multistate Trust Agreement

See Accountant's Compilation Report

Multistate Environmental Response Trust
Schedule of Budget to Actual
Navassa ECA
For the Quarter and Nine Months Ended Septmeber 30, 2017

	July - Sept 17	YTD	Budget	Variance	% of Budget
Deductions from Net Trust Assets:					
A · Regulatory Compliance/ O&M	$ -	$ -	$ 10,000.00	$ (10,000.00)	0.0%
C · New Environmental Actions	511,250.61	1,514,419.44	3,104,000.00	(1,589,580.56)	48.79%
D · MST Tech Team/Project Mgmt	116,465.87	355,825.64	553,000.00	(197,174.36)	64.35%
E · Trustee Fees & Expenses	12,390.00	82,002.96	163,000.00	(80,997.04)	50.31%
F · Regulator Oversight Costs	-	-	500,000.00	(500,000.00)	0.0%
G · Legal/Accounting Costs	12,913.75	62,340.40	70,000.00	(7,659.60)	89.06%
Total Deductions from Net Trust Assets	$ 653,020.23	$ 2,014,588.44	$ 4,400,000.00	$ (2,375,411.56)	45.79%
Additions to Net Trust Assets:					
Investment Income, less expense	$ 97,553.07	$ 262,302.81	$ -	$ 262,302.81	100.0%
Unrealized gain (loss) on investments	(17,914.18)	(43,873.09)	-	(43,873.09)	100.0%
Total Additions to Net Trust Assets	$ 79,638.89	$ 218,429.72	$ -	$ 218,429.72	100.0%

Note:
ECA - Environmental Clean-up Account
SA - Segregated Account
AA - Anadarko Account

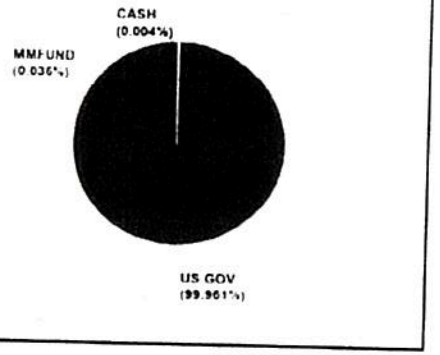
See Accountant's Compilation Report

[redacted]

Report: Quarterly Presentation
Account: [redacted]
Date: 07 01 2017 09 30 2017

Cash and Fixed Income Summary		
Risk Metric		Market Value
Cash		1,785
Treasury MMFund		16,466
Fixed Income		46,249,489
Total Portfolio	$	46,267,740
Duration	1 37	
Years to Final Maturity	1 397	
Yield	1 389	
Avg Credit Rating	AA+/Aa1/AA+	
Interest Income	$	122,307

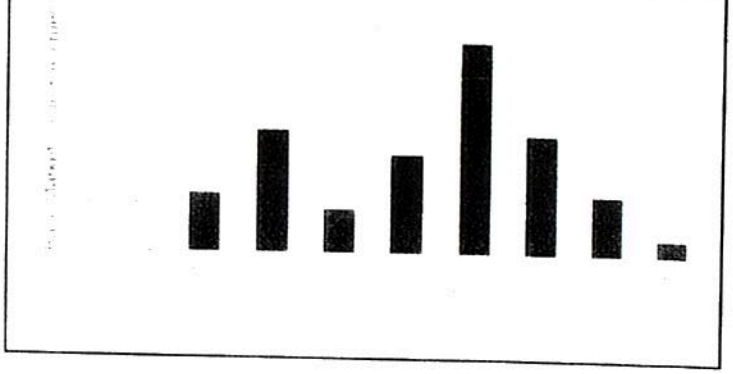
Base Exposure - Market Sector



Credit Rating

Issuer Concentration	
Issuer Concentration	Market Value
Government of the United States	100 0%
Treasury MMFund	0 0%
Cash	0 0%
Total Portfolio	100.0%

Duration



Compliance Overview	
Status	Compliant
As of	09/30/2017

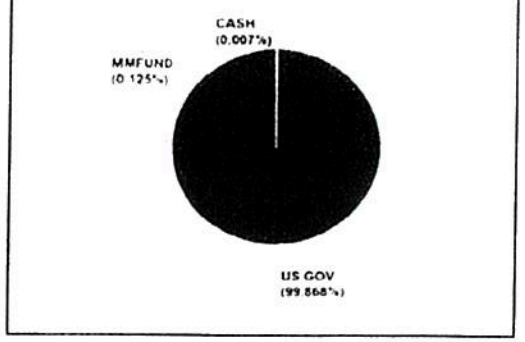
See Accountant's Compilation Report

[redacted]

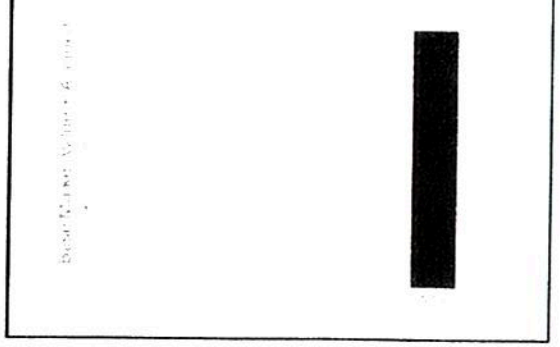
Report Quarterly Presentation
Account [redacted]
Date 0 01 201 09 30 201

Cash and Fixed Income Summary		
Risk Metric		Market Value
Cash		249
Treasury MMFund		4,563
Fixed Income		3,630,805
Total Portfolio	$	3,635,617
Duration	1 693	
Years to Final Maturity	1 73	
Yield	1 447	
Avg Credit Rating	AA+/Aa1/AA+	
Interest Income	$	10,168

Base Exposure - Market Sector

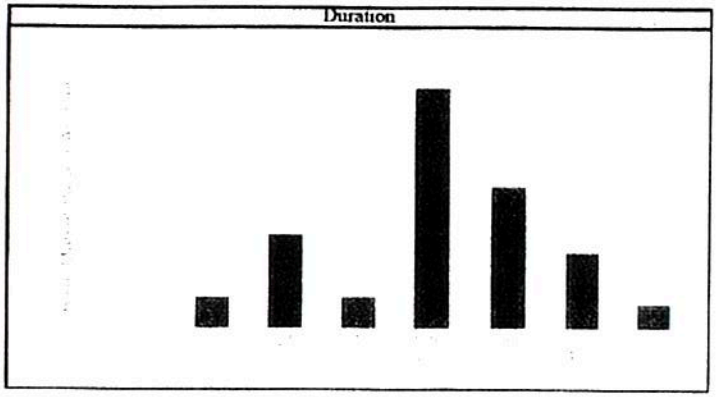


Credit Rating



Issuer Concentration	
Issuer Concentration	Market Value
Government of the United States	99.9%
Treasury MMFund	0 1%
Cash	0.0%
Total Portfolio	100.0%

Duration



Compliance Overview	
Status	Compliant
As of	09/30/2017

See Accountant's Compilation Report